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ABSTRACT

The validity of skills developed in college to subsequent career performance was studied at Alverno College. The study sample included over 750 women students, over 60 alumnae, over 80 women nurses and over 100 women managers and executives from the Milwaukee community. Attention was directed to: whether the competencies and assessment techniques of the learning process are valid; how students change on college outcomes (i.e., cognitive aptitude, learning styles, and generic abilities); whether outcomes are mirrored in students' perceptions of their learning and abilities; how outcomes learned in college relate to lifelong learning, abilities, careering, and professional development after college; and the competencies that describe the performance and perceptions of outstanding professionals. Specifically, the outcomes of attending Alverno College were evaluated, with attention to the curriculum, student changes in performance on college-defined abilities, and personal growth outcomes. Appendices include abstracts of 11 validation or outcome research reports, and information on Alverno dissemination efforts. Included are a list of institutions that either participated in Alverno College seminars or received written materials, as well as a list of Alverno College publications and conference/seminar papers. (SW)

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CAREERING AFTER COLLEGE

ESTABLISHING THE VALIDITY OF ABILITIES LEARNED IN COLLEGE FOR LATER CAREERING AND PROFESSIONAL PERFORMANCE

MARCIA MENTKOWSKI   AUSTIN DOHERTY

FINAL REPORT TO THE NATIONAL INSTITUTE OF EDUCATION

OVERVIEW AND SUMMARY

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Funded by a grant from the National Institute of Education:
Careering After College: Establishing the Validity of Abilities
Learned in College for Later Success
(NIE–G–77–0058)

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This overview and summary is the overarching paper in the series that comprise M. Mentkowski and A. Doherty, Careering After College: Establishing the Validity of Abilities Learned in College for Later Careering and Professional Performance: Final Report to the National Institute of Education. Milwaukee, WI: Alverno Productions. 1983, 1446 pages.

The research reports described in this overview and summary and included in the final report are:

One: Friedman, M., Mentkowski, M., Earley, M., Loacker, G., & Diez, M. Validating Assessment Techniques in an Outcome-Centered Liberal Arts Curriculum: Valuing and Communications Generic Instrument, 1980, 54 pages.

Two: Friedman, M., Mentkowski, M., Deutsch, B., Shovar, M.N., & Allen, Z. Validating Assessment Techniques in an Outcome-Centered Liberal Arts Curriculum: Social Interaction Generic Instrument, 1982, 78 pages.

Three: Assessment Committee/Office of Research and Evaluation. Validating Assessment Techniques in an Outcome-Centered Liberal Arts Curriculum: Insights From the Evaluation and Revision Process, 1980, 5 pages.

Four: Assessment Committee/Office of Research and Evaluation. Validating Assessment Techniques in an Outcome-Centered Liberal Arts Curriculum: Integrated Competence Seminar, 1982, 58 pages.

Five: Assessment Committee/Office of Research and Evaluation. Validating Assessment Techniques in an Outcome-Centered Liberal Arts Curriculum: Six Performance Characteristics Rating, 1983, 74 pages.

Six: Mentkowski, M., & Strait, M. A Longitudinal Study of Student Change in Cognitive Development, Learning Styles, and Generic Abilities in an Outcome-Centered Liberal Arts Curriculum, 1983, 357 pages.

Seven: Much, N., & Mentkowski, M. Student Perspectives on Liberal Learning at Alverno College: Justifying Learning as Relevant to Performance in Personal and Professional Roles, 1982, 83 pages.

Eight: Mentkowski, M., Much, N., & Giencke-Holl, L. Careering After College: Perspectives on Lifelong Learning and Career Development, 1983, 124 pages.

Nine: Mentkowski, M., DeBack, V., Bishop, J., Allen, Z., & Blanton, B Developing a Professional Competence Model for Nursing Education, 1980, 74 pages.

Ten: Mentkowski, M., O'Brien, K., McEachern, W., & Fowler, D. Developing a Professional Competence Model for Management Education, 1982, 317 pages.

Also available from Alverno Productions: (order form on last page)

Mentkowski, M., Moeser, M., & Strait, M. Using the Perry Scheme of Intellectual and Ethical Development as a College Outcomes Measure: A Process and Criteria for Judging Student Performance. Vols. I & II, 1983, 516 pages.

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Second Edition

PREFACE

When Alverno revised its liberal arts curriculum in 1973 to focus on abilities, the college was immediately asked a series of questions from all quarters: Does the curriculum work? Does the curriculum contribute to student outcomes—and to graduates in the world of work? What have you learned about student learning and development that can inform issues in higher education and generalize to other settings? In 1976, the second author of this report invited the first author to initiate, create and direct a college-wide effort to respond to these questions. We began longitudinal studies that fall. A year later, we garnered three years of financial support from the National Institute of Education to carry out a validation model and created an Office of Research and Evaluation which is now funded by the college.

During our dissemination of preliminary findings, we found that the questions surrounding curriculum innovation and institutional reform in the seventies are even more alive in the eighties, as the nation expresses its concern for quality and excellence in education. Questioners in the seventies, who wondered aloud whether changes in liberal arts curricula would positively affect learning outcomes, have become more focused, and more demanding of explicit and practical answers. They are less interested in maps for total institutional reform. Rather, they are asking for descriptions of student development and abilities and of teaching and assessment strategies that ensure high performance learning in diverse settings, for diverse groups.

Thus, we highlight those findings that speak to these questions, and that guide our current studies. In fact, this second edition of the overview and summary expands on these findings, following last year's presentations at specially convened seminars sponsored by the American Association for Higher Education, the National Institute of Education and the Carnegie Corporation of New York.

During these and other presentations, many of our colleagues expressed interest in the broader issue of validation. Concerned about validating their own programs, they wished to know how we conceptualized the validation of a liberal arts, outcome-centered curriculum. We have responded to this interest by describing the more detailed faculty questions that stimulated the initial study of college outcomes at Alverno, in the context of the validation model that has guided our efforts. Thus, this overview and summary first describes the rationale for validating outcome-centered higher education curricula and our validation model drawn from faculty questions. We then describe the research objectives based on these questions and our approaches to instrumentation and methodology.

In the last two sections of the report, "What are the Outcomes of an Alverno College Experience," and "How do Alverno College Outcomes Relate to the World of Work," we summarize the last eight years of results from our studies of learning outcomes. We then relate the findings to our overall purposes and discuss implications for higher education. These sections, including "New Directions" and "Summary," are printed on gray paper (pages 95 to 165), and are designed for the reader who wants an immediate overview. This synthesis is drawn from the ten research reports listed on the inside cover that form our final report to the National Institute of Education, as well as our other more recent reports. We also include abstracts of the research reports, identify our dissemination strategies and list the range of colleges and universities, corporations, agencies and schools whose questions and insights have contributed to our efforts during these past eight years.

This research represents the collaborative work of the Alverno faculty, Office of Research and Evaluation staff, Alverno students and alumnae, and Milwaukee organizations and professionals. Our acknowledgements to them and to other colleagues follow the preface.

This work is dedicated to our students, whose belief in our ability to improve education gives us the faith and courage to continue learning, and to research the penetrating questions that challenge higher education today.

Marcia Mentkowski

Austin Doherty

Milwaukee, Wisconsin
May 1984

ACKNOWLEDGEMENTS

For the past seven years, we have worked with colleagues in a variety of roles to complete the research outcomes reported here. We gratefully recognize all contributors to this volume, and we hope to convey by these acknowledgements that educators and researchers in higher education can collaborate to achieve research and evaluation outcomes that benefit all of us.

This project was undertaken with the support of the Alverno administration, faculty and students; colleagues from across the country; the National Institute of Education; and research participants from the Alverno student body and alumnae, and the Milwaukee business and professional community.

The administration and faculty of Alverno College worked in close concert with Office of Research and Evaluation staff to create and carry out the research. Joel Read, Vivien DeBack, Mary Hueller, Rosemary Hufker, Theophane Hytrek, Celestine Schall, Alice Theine, Christine Trimberger, Allen Wutzdorff, and several department coordinators assisted in contacting participants.

All faculty assisted in some way in this project. Those who contributed directly to the research reports are: Zita Allen, Jean Birkey, Robert Birney, Barbara Blanton, Vivien DeBack, Bernardin Deutsch, Mary Diez, Margaret Earley, George Gurria, Patricia Jensen, Joan Koehler, Cathleen Krzyminski, Dimitri Lazo, Georgine Loacker, William McEachern, Agnes Meysenburg, Marlene Neises, James Newton, Kathleen O'Brien, James Roth, Jean Schafer, M. Nicolette Shovar, Judith Stanley, Kyle Stewart, Alice Theine, Christine Trimberger and Allen Wutzdorff. Those who contributed indirectly to the research reports are: Barry Burd, Patricia Burns, Katherine Couture, Rita Eisterhold, Jane Halonen, Ruth Hoerig, Rosemary Hufker, Anne Huston, Patricia Hutchings, Everett Kisinger, Gertrude Kramer, Nancy Maynard, Clare Novak, Maria Terese Patterson, Penelope Reed and Ann Schlaefer.

Several current and former members of the Office of Research and Evaluation contributed to the research reported here at some time during the last seven years. While their responsibilities and their contribution varied, all were committed to respect for the involvement of the participants, to high standards for data collection, accurate recording, and careful analysis and writing. They include Nancy Much, Michael Strait, Deborah Fowler, James Bishop, Miriam Friedman, Mary Moeser, Elizabeth Davies, Eunice Monroe, Laura Giencke-Holl, Nancy Miller, Mary Ellen DeHaven, Susan McAllister, Lois Grau, ZaZa Popovic, Maureen Wahl, Kathleen Denny, Nevenka Davis, Jerilyn Bar, Donna Siekert, Judith Meehan, Margaret Quinn and Delores McCrimmon. Student assistants include Jacqueline Guillory, Vicki Lengyel, Lisa Nevins, Bernadette Meyer, Sue Schultz and Jean VanSciver.

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Laura Giencke-Holl produced the final report with the assistance of Margaret Quinn. Mark Hein edited this overview and summary. Joan Hahn and staff of Secretarial Services and the staff of Alverno Productions, Patricia Kosz in particular, enabled us over the years to communicate our work to a range of audiences. Christine Renstrom prepared the graphics for this second edition, and Frank Miller, Assistant Vice President for Marketing Communications assisted in the dissemination of the findings.

Many production instruments were used in this project and assessors showed ingenuity and insight in judging performance samples from students, alumnae and professionals. Assessors include Zita Allen, James Bishop, Elizabeth Davies, Vivien DeBack, Deborah Fowler, Jeanne Jung, William McEachern, Nancy Miller, Mary Moeser, Nancy Much, Kathleen O'Brien, ZaZa Popovic, Jean Schafer, Robert Scorgie, M. Nicolette Shovar, and Michael Strait. John Gibbs and Clark Power, while at the Center for Moral Education at Harvard University, coded the Moral Judgment Instrument. McBer and Company of Boston coded instruments from the Cognitive Competence Assessment Battery under the direction of Ann Litwin.

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Following the 1983 publication of this report, Russell Edgerton, President of the American Association for Higher Education, together with Manuel Justiz, Director of the National Institute of Education and E. Alden Dunham, Program Officer of the Carnegie Corporation of New York, collaborated with us in the release of the report and further dissemination of the findings. This collaboration was instrumental in eliciting the reactions and insights of many leaders in higher education and its related associations and agencies, and further stimulated our own thinking about a current and future research agenda.

THE AUTHORS

Marcia Mentkowski, director of the Office of Research and Evaluation and Professor of Psychology, initiated, created and directs Alverno College's research program including the continuing longitudinal studies. With her faculty colleagues, she implements findings for instruction and assessment. She has presented the research findings at a series of national conferences, and has served as a consultant to colleges, professional and graduate schools on research and assessment issues.

Austin Doherty, vice president for Academic Affairs and Dean of the College, is one of the original designers of Alverno College's ability-based curriculum and assessment process. Since its inception in 1973, she has remained involved in its refinement and evaluation, and has served as a consultant to numerous colleges and universities on curriculum and assessment issues.

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CAREERING AFTER COLLEGE
ESTABLISHING THE VALIDITY OF ABILITIES LEARNED IN COLLEGE FOR LATER CAREERING AND PROFESSIONAL PERFORMANCE

Marcia Mantkowski **Austin Doherty**

ALVERNO COLLEGE

ABSTRACT

What differences does college make? Can it really promote the kind of broad personal and intellectual development that lasts a lifetime? Can it enhance a person's abilities and improve his or her chances at having an effective career? Can it benefit the "new" student body--adults, women, minorities--as well as traditional college students? Do the outcomes of college show up on the job?

That students change in college is taken for granted by most college educators and has been demonstrated by several researchers of college outcomes (Astin, 1977; Feldman & Newcomb, 1969; Heath, 1977; Pace, 1979; Perry, 1970; Vaillant, 1977; Winter, McClelland & Stewart, 1981). That students change in college as the result of performance in a particular curriculum is more difficult to show. How students change, and who changes and why--and with respect to what broad, complex abilities, learning styles and cognitive-developmental patterns (Chickering & Associates, 1981)--is even more illusive. Demonstrating that these changes persist beyond college to effective performance in work and personal roles is perhaps most challenging of all. Showing that abilities selected by college faculty and demonstrated by their students are used by outstanding professionals in the world of work, is clearly a new issue for college educators.

Yet these are precisely the issues raised by one liberal arts college faculty[1] who broke with tradition and implemented an

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[1] The faculty we have been working with are our colleagues at Alverno College, a Midwestern liberal arts college for women with about 1400 degree students in both weekday and weekend time frames. Alverno, which has focused for a century on preparing women for professional careers, formally adopted an outcome centered approach to its curriculum in 1973, accrediting students for progressive demonstration of certain broad abilities in all subject areas.

outcome-centered liberal arts curriculum in 1973. The faculty identified broad outcomes promised by many colleges. But they defined these complex abilities through a set of pedagogical levels that allowed for their successive achievement, and created measures that assessed not only knowledge, but the student's performance. When the first students were about to graduate from the new curriculum, the faculty engaged in a multifaceted attempt to focus on the external validity of the abilities they had identified. It was in the context of an overall plan to validate outcomes of college that we designed a set of parallel and interrelated studies to research abilities from multiple points of view, across multiple points in time, using multiple groups, with multiple opportunities for critique and comparison. These studies were then funded by a major three-year grant from the National Institute of Education toward the goal of establishing the validity of abilities learned in college for later careering and professional performance (Mentkowski & Doherty, 1977). The research studies, proposed in five project objectives for NIE, dealt with several themes. One is related to identifying broad outcomes of college, including those abilities critical to effective performance at work, and how abilities can be defined, assessed and validated. Another theme concerns the extent to which the curriculum contributes to development and change in outcomes, particularly if they are defined as cognitive-developmental patterns, learning styles and broad, generic abilities. A third theme relates abilities learned in college to the world of work.

We had a distinct advantage in designing and carrying out research on these issues. The faculty, with whom we were working, had already identified the more "intangible" outcomes of college such as life span development and lifelong, independent learning, as important goals. They had spent several years identifying the broad, generic abilities they wanted their graduates to show (e.g., communications, analysis, social interaction, problem solving and valuing; Alverno College Faculty, 1976), and relating them in increasingly explicit terms to the program, courses and learning activities their students engaged in. These abilities were defined as developing or teachable, as transferring across multiple settings and as internalized characteristics of the person, rather than discrete sets of skills.

This gave us a full range of college-generated definitions to work with in researching student outcomes. The college's own methods for assessing each student's progressive development of her abilities (Alverno College Faculty, 1979) provided one set of measures for those outcomes. And we contributed to identifying and validating a set of cross-disciplinary measures of college performance (Alverno College Assessment Committee/Office of Research and Evaluation, 1980, 1982, 1983; Friedman, Mentkowski, Deutsch, Shovar & Allen, 1982; Friedman, Mentkowski, Earley, Loacker & Diez, 1980).

Along with these definitions and measures, we identified a parallel set. These were drawn in part from other practitioners and researchers with whom we were already working. While there were few, if any, measures that matched the faculty defined abilities directly, we selected measures representing the newer directions for defining and assessing broad, more intangible college outcomes, because these were most like the overall goals of the Alverno curriculum. Measures were selected that most nearly reflected the faculty's emerging theory of performance assessment. We administered a battery of twelve cognitive-developmental (Kohlberg, 1981b; Loevinger, 1976; Perry, 1970; Piaget, 1972; Rest, 1979a), learning style (Kolb, 1983), and generic ability measures (Watson & Glaser, 1964; Winter, McClelland & Stewart, 1981)--we call them human potential measures--to over 750 students in a five year cross-sectional and longitudinal study. Two hundred of these formed the longitudinal group. Our goals were to describe change in college, to see if change could be attributed to performance in the curriculum, and to identify the underlying themes in these change patterns (Mentkowski & Strait, 1983). We also thereby contribute to the development and further test of these measures (Mentkowski, Moeser & Strait, 1983). These twelve measures, along with five of our own that assessed student performance in the curriculum and enabled a test of its impact, yielded 17,500 responses.

At the same time, we set about systematically gathering data about the students' perceptions. This meant creating an open-ended interview format that allowed students to generate their own definitions of the college experience, with particular emphasis on how they saw themselves changing, and why. We administered the interview to the same group of 80 students at the end of each year in college and to about 40 Seniors. These students were already part of the larger sample just described, and were completing the human potential measures in that longitudinal study (Much & Mentkowski, 1982). Altogether, they contributed nearly 400 interviews.

To examine outcomes in the workplace and other post-college life settings, we used several approaches. We first extended our interview studies beyond graduation. Over 30 two-year alumnae, also interviewed as Seniors, completed in-depth interviews where they discussed new learning at work, and the abilities and processes that enabled careering and professional performance after college. Second, we created a careering questionnaire for all 60 two-year alumnae. We were able to focus specifically on how new graduate and two-year alumna attitudes and expectations evolve as they develop their professional roles and make career decisions since the same measure was concurrently administered to Seniors (Mentkowski, Much & Giencke-Holl, 1983). We initiated two studies with outstanding professionals in nursing and management (who were not Alverno alumnae), to derive models of the actual abilities these groups perform on the job, in order to compare these with the outcomes sought by the college as well as those described by its graduates (Mentkowski, DeBack, Bishop, Allen & Blanton, 1980; Mentkowski, O'Brien, McEachern & Fowler, 1982). Eighty nurses from three health care settings and over 100 managers from 53 Milwaukee companies contributed performance interviews which generated 1,000 critical incidents. The professionals also completed careering histories, and ratings of abilities critical for education, selection and performance.

We are finding some encouraging results:

- the verifiable outcomes of a liberal education as taught at Alverno include broad, complex processes of the kind educators claimed, and these abilities can be reliably measured;
- they include cognitive-developmental patterns, learning styles, intellectual abilities and the more active/interactive abilities sought in professional work situations, and abilities related to the broader domain of personal development;
- these intellectual and interpersonal abilities are the basis of effective performance in professions;
- student development of these abilities can be reliably attributed to their successful performance in the curriculum, where students apply and use these abilities in coursework, simulations, external assessments and internships;
- both younger students, 18 to 22, and older more experienced students from varying life backgrounds show patterned development of these abilities;
- students continue to develop these abilities and adapt them into personal and work settings both during and after college. Through the curriculum, students are, in essence, learning to learn. They continue personal and career development on their own;
- these abilities can be related directly to those used on-the-job by alumnae and other effective professionals;
- a validation design can be created that enables a college to demonstrate accountability to its constituents--by comparing its student and alumnae outcomes to the standards of the educational research community, professionals, and theorists of adult learning and growth. This effort improves the curriculum and contributes to generalizable theory and practice of teaching, learning and assessment.

We have also been able, along the way, to make some contributions to the developing field of educational program evaluation and to the repertoire of procedures for validating developmental outcomes. In many ways, we had to rethink the operational definition of validity as it is applied in a practiced-based research setting. Our work also seems to be offering some substantive support for the goals of outcome-centered curriculum design.

These are early results from an effort that is now ongoing and a part of the learning process. But they do suggest that higher education can indeed help society achieve its goals for quality, equal access and mobility by contributing demonstrably to each student's cognitive, interpersonal, and personal/professional growth abilities. They indicate that Alverno's curriculum also contributes to the student's ability to integrate these abilities and apply them effectively in later life settings, particularly in the world of work.

An ability-focused curriculum with a strong emphasis on assessment and integrated learning across an institution can satisfy student needs for personal growth and career. Ability-based learning yields both traditional liberal learning values and the high performance learning outcomes that prepare students for their place in work and society.

WHY FOCUS ON OUTCOMES IN HIGHER EDUCATION?

Why specify outcomes in higher education? Society as a whole is currently questioning if outcomes claimed by higher education, especially the liberal arts, are actually achieved. This is partly because societal needs for higher education have changed. We have become a service rather than a production society, where more and more of us need a quality education and technological skills. We have become a knowledge society, where the emphasis is on using knowledge because we can no longer master it all. And we have become a society of rapid change, where each person needs preparation for changing jobs and responsibilities. Employers of college graduates complain that graduates no longer have traditional outcomes of college such as thinking, writing, and problem solving, let alone the ability to adapt skills to changing roles and contexts.

Periods of economic stress sharpen the demand for usefulness. There is more emphasis on showing that abilities learned in college make a difference in contributing to society after college. Consequently, higher education is expected to show a relationship between abilities learned in college and professional productivity and development. Education for more productive work has become a new theme on college campuses.

In the past, college as preparation for life was generally assumed. Highly selective colleges admitted persons with high scores on admissions tests and were rarely asked to demonstrate that their graduates had productive lives after college because studies of college outcomes showed that income, status, and productivity in the work force were more pronounced among college graduates. The new student body has changed that. Minority ethnic and racial groups, the poor, the handicapped, and women are now making up a larger segment of the college population. They are coming to college expecting higher status jobs. Economic and social mobility are thought to result from higher education. Minorities expect that college will assist in erasing discrimination and allow them greater access to society's benefits. Nontraditional students, adults who are already experienced in multiple roles, are also coming to college in record numbers. They expect that college learning does indeed build on life and work experience, and is not just a paper qualification. This is in sharp contrast to an outmoded concept of college as an opportunity to momentarily escape from life's pressing demands, and to experience learning for its own sake, unencumbered by the need to earn a living or to support a family. Yet both younger and older students look to college for assistance in their search for meaning in a confusing world.

Expecting that abilities learned in college will directly contribute to one's opportunities and success at work comes particularly from the large nontraditional college population. This group, particularly women, have already experienced the impact of lack of abilities that are needed for advancement out of traditional clerical and service positions to positions with more responsibility and opportunity. These women are likely to expect, ask for and demand that college be accountable to demonstrating that the educational outcomes taught are those necessary to achieve their own professional goals (Cross, 1981). And traditional age students are now joined in this expectation of a career after college (Astin, 1982).

Higher education faculty question higher education's ability to respond to these needs. They ask if liberal arts outcomes can survive in the new aura of learning for work rather than learning for its own sake. Can liberal arts goals be developed in an atmosphere of professional education and education for work? Will open access lower standards? Will the more traditional outcomes of college be sacrificed for graduates' technical expertise? Are students still learning to analyze, to think critically, to solve problems, create new ideas and ways of thinking, to appreciate multiplicity in context and culture, and to achieve quality of life? Can colleges be responsive to the new student body and the values of today's student and still maintain high standards for student performance in college?

Faculty also question how liberal arts colleges can maintain an orientation to the demands of society to teach toward careering and the needs of the marketplace and still maintain the "student centered" atmosphere of the liberal arts college. Here student development is a primary outcome and focus. College is a time to find one's way out of adolescence and to take on adult responsibilities, or to broaden one's world view through the arts and humanities.

College students in general are also pressing for the more intangible outcomes of college. Self-fulfillment has been labeled as the "new morality" in our society (Yankelovich, 1981) and college students are also expecting their efforts to bring self-fulfillment and personal development. While self-fulfillment is clearly a goal, college students also expect advancement and career achievement (Astin, 1982). Minority groups and women have also come to appreciate the insights college offers for developing their role as active members of society.

All of society seems to be more interested in accountability. The consumer movement, the rise of special interest groups, are two indications that individuals are expecting institutions to be more accountable, to complete their share of the contract. Colleges have been known to promise economic and social mobility, personal growth, and other broad outcomes. Students are more and more taking them at their word, and expecting that the degree makes a difference. They are asking colleges to demonstrate, not just to promise, that the insitiution will be responsible for fulfilling their part of the bargain. Expectations for quality of life, for careering after college, for preparation for life as well as work, for achieving personal development as well as professional development, all create an atmosphere of accountability.

Finally, there is the current quest for quality. Quality in education is now demanded by students, higher education faculty, commissions on excellence, and by society at large. These expectations for quality are there despite accelerated change, an information and technological explosion, and needs for equal access and equality of educational opportunity. For many, accounting for quality means demonstrating relationships between college, personal growth and professional development. All of these reasons have prompted the move toward defining, assessing, and validating educational outcomes.

WHY VALIDATE OUTCOMES IN HIGHER EDUCATION?

We have just outlined the rationale for focusing on outcomes in higher education. Why establish the validity of outcomes? Most colleges and universities have not felt compelled to validate that students achieve outcomes or to relate those outcomes to future outcomes. Indeed, the effectiveness of college has often been taken for granted. Why launch a major effort to validate outcomes?

The rationale for validating outcomes is similar to that for focusing on outcomes. First, the press for accountability in higher education is logically translated into demonstrating that education is related to and is adequate preparation for work, and that education is adequate preparation for life. Validating the outcomes of college means demonstrating that a liberal arts education assists students to meet the prerequisites for later personal and professional performance. But the press for accountability is not just a utilitarian one. We are no longer interested in demonstrating only that education is useful. We are interested in demonstrating that education is equitable, that persons without traditional backgrounds can achieve traditional outcomes. Demonstrating that our open access policy does not lower quality is as important as being accountable.

Still more important for the adult student is the need to show that outcomes achieved can be attributed to the college experience rather than just to maturation. Does college enhance life experience for the older adult, or does education interfere with, rather than build on experience? We are no longer willing to accept that outcomes demonstrated at graduation are valid unless they persist over time, or contribute in some way to the development of later abilities that are critical to future outcomes (Astin, 1977, p. 210).

If outcomes are no longer defined as static, but as developmental, then change and its causes are important aspects of demonstrating validity. What curricular aspects cause change in higher education? This question shows an increased emphasis on the importance of continued program development. It is generally recognized that embarking on validation research can enhance higher education's ability to create effective programming. Focusing on abilities and processes as outcomes, rather than knowledge alone, and assessing for them in a performance-based curriculum, is a "new idea" in higher education. Consequently, it is expected to prove itself--to show that it is doing what it claims to do. New strategies are usually much more open to question and expected to be researched before adoption.

Validation research can do much to enlighten us on the characteristics of the new student's learning, abilities, cognitive-developmental patterns and learning styles so that all of higher education, whether or not it is performance-based, can become more responsive to student needs. How do students learn? How do they develop? And how do students actually experience learning--from their point of view? Validation research is critical to building a generalizable educational model for adult learning and development, particularly in view of the needs of today's more nontraditional student body.

Finally, validation research that identifies the abilities of effective professionals bridges the gap between the college faculty and the professional community. Both groups have a stake in ensuring that abilities learned in professional programs are those critical for effective performance at work after college.

DEFINING, ASSESSING AND VALIDATING COLLEGE OUTCOMES

In response to recent concern about the value of a liberal arts degree, college educators are beginning to identify, measure and credential broad abilities that are expected outcomes of college (Loacker & Palola, 1981). Moreover, some college educators are no longer satisfied to judge program effectiveness by comparing their students' performance against standardized test norms. Rather, they are questioning how colleges might assess students using criteria or standards derived from outcomes describing the performance of a liberally educated, competent adult. Other educators view college as a catalyst for lifelong development, and want to know if abilities learned in college are related to the future personal and professional performance of graduates (Mentkowski & Doherty, 1977).

These educators are interested in comparing students' mastery of broad abilities to their potential for enhanced human development. How do outcomes characteristic of college students compare with their developmental potential, with what is possible for them to achieve as humans? Some educators feel these questions should be raised not only about learned abilities faculty can currently measure and credential, but also about the more "intangible" outcomes of the college experience, those traditionally promised to graduates by most liberal arts colleges. These more intangible outcomes include continued life-span development, transition to "life after college," transfer of learning to various settings and professional positions, self-directed and integrated personal functioning and lifelong learning.

College Outcomes: Frameworks and Measures

Educators are beginning to define and assess for broad generic abilities or competences, and more intangible outcomes. Their goal is to further define and understand the nature of abilities and outcomes they teach toward as an important source for curriculum development. One problem these educators face is the lack of standardized external criterion measures that measure abilities and that predict later performance after college, to which they can compare student performance outcomes. There has been more interest in operational understanding of broad outcomes since publication of The American College (Sanford, 1962), and the recent move toward outcome-centered curricula is a thrust in that direction (Grant & Associates, 1979).

In the recent past, some educators, colleges and professional schools have identified outcomes and developed ways to assess them (Grant & Associates, 1979; Loacker, 1981). (Examples include Alverno College, Antioch School of Law, Brigham Young, College III of the University of Massachusetts, College for Human Services, Delaware County Community College, Florida State, Harvard University, Iowa Wesleyan, Kirkhof College, Mary College, Metropolitan State, Miami-Dade Community College, Mt. Hood School of Nursing, New Rochelle College, North Adams State, Northwestern University School of Music, Our Lady of the Lake, Southern Illinois University School of Medicine, University College at the University of Louisville, University of Montana School of Law, the University of New Mexico School of Medicine, and others.) Many of these institutions are now addressing outcome validation issues. They are asking hard questions about the extent to which students are able to demonstrate outcomes educators have identified as important for all college students to master. But what measures are available that will contribute to program evaluation and outcome validation?

Linking Education and Work: Generic Ability Measures

Several efforts in defining and assessing college outcomes are specifically focused on performance measures of general abilities and characteristics predictive of effectiveness in later life (e.g., ACT's College Outcome Measures Project, McBer and Company's Cognitive Competence Assessment Battery). These more focused measures might appear redundant with the usual grade reports and standardized achievement or aptitude tests in predicting future performance. Yet these conventional measures and indices have not shown much relationship to later behavior (McClelland, 1973, 1980). The effectiveness of the new performance measures has not been determined as yet, but initial tests are underway in this study and elsewhere (Winter, 1979; Winter, McClelland & Stewart, 1981).

In 1975, the Fund for the Improvement of Post-secondary Education supported a consortium of colleges in trying out some newer measures to assess outcomes. As a member of this group of colleges, Alverno participated in the FIPSE project, awarded to McBer and Company, by administering some of these new measures. These instruments, collected or developed by McBer, later became known as the Cognitive Competence Assessment Battery (Winter, McClelland & Stewart, 1981).

When Alverno sought to identify external criterion measures for inclusion in a validation study of student outcomes, we selected these measures because they most nearly represented some of the abilities identified by Alverno faculty. The Cognitive Competence Assessment Battery provided a particular focus on generic abilities of analysis, and included assessment of motive dispositions and other characteristics important to the relationship between learning and later behavior. Because other colleges were also administering these measures, we could count on some comparison data.

These newly-developed measures of generic abilities can serve as better outcome measures, but we are still faced with the need to measure abilities learned in college in the context of lifelong learning and development. How are abilities learned in college transformed through personal and professional experience? How can we recognize them in the older adult? The search is on for better ways to measure the more intangible outcomes of college, those that are often referred to as personal development outcomes (Bray, Campbell & Grant, 1974) or other personal maturity variables (Heath, 1974, 1976, 1977). How else might we ensure that college outcomes become integrated aspects of the whole person that might be expected to develop beyond college?

Developmental Theory:
Cognitive-Developmental Measures

It is in relation to the problem of defining and assessing abilities learned in college set within a context of lifelong learning and life-span development that we proposed using cognitive-developmental theorists' descriptions of human growth and development as sources for college outcome measures (Mentkowski & Doherty, 1977). Indeed, Chickering and Associates (1981) have recently advanced the argument that an overarching goal of higher education is encouraging developmental change. Developmental psychologists have described broad developmental domains that can be measured, such as moral development (Kohlberg, 1976); ego development (Loevinger, 1976); cognitive development (Piaget, 1972); and intellectual and ethical development (Perry, 1970, 1981). These theorists provide us with descriptions of the way in which individuals cognitively structure meaning and make sense out of their experiences. Descriptions of development, whether via a series of stages (Piaget, Kohlberg), ego levels (Loevinger), or positions (Perry) provide us with a partial picture of students' potential for growth. They describe some of the more universal outcomes of human functioning against which educators can validate more intangible curriculum outcomes.

While we do not expect that educators will use a student's current developmental level, position or stage as a measure of performance to credential or pass a student, such information can be used to describe where the student is in his or her development. Assessing student performance on these measures over time gives us important information on individual patterns of development during college, and helps us evaluate the extent to which college or specific curriculum interventions are contributing to the general cognitive growth of learners.

This approach to validating student outcomes suggests assessing students on various levels of cognitive development as part of program evaluation designs. Using cognitive-developmental measures to assess college outcomes has another important value. The results can be used to inform instruction, and to assist in creating appropriate curricula. We expect this research to reduce the "size of the existing gap between developmental theory and educational practice" (Astin, 1983).

Experiential Learning Theory: Learning Style Measures

Experiential learning theory and research has more recently described learning as a process (rather than as static outcomes), where knowledge is created and linked to action through the transformation of experience (Kolb, 1983). While cognitive-developmental theories describe assimilation and accomodation as the basis for an interactive learning process, these theories are less likely to describe individual differences in learning. Cognitive-developmental patterns tend to describe common paths in the growth of intellectual development. A variety of reseachers have centered on learning style as an important indicator of student learning and development (Curry, 1983). Basically, these researchers are interested in specifying individual differences in approaches to learning, cognitive styles, and differences in learning style preferences. Since feedback on learning style is one way to assist students to analyze their own approaches to learning, faculty find that learning style measures can be important not only for curriculum design, but also for assisting students to become more open to other modes of learning (Deutsch & Guinn, Note 1). The Council for the Advancement of Experiential Learning has supported development of teaching and assessment strategies based on learning by experience (Keeton & Tate, 1978), and giving credit for learning that occurs in other than formal, or classroom learning settings. Experiential learning is seen as a process that links education, work and personal development (Kolb, 1983). We have proposed using learning style measures as a way to tap college outcomes particularly because Alverno's curriculum is based partly on experiential learning theory (Doherty, Mentkowski & Conrad, 1978), and because of the strong emphasis on student involvement in both in-class and off-campus learning experiences (Mentkowski, O'Brien, Cleve & Wutzdorff, 1983).

Competence Assessment: Performance Interviews and Inventories

Another approach to the definition and assessment of outcomes we researched in the current studies was the performance assessment of effective professionals in order to build models of their abilities or competences. While performance assessment of alumnae is rare, we determined it to be a way to identify abilities alumnae do perform after college, to establish a link to abilities learned during college. Performance assessment of alumnae was beyond the scope of the current set of studies until we had first completed the round of open-ended perspectives interviews and careering questionnaires (see below). We do plan future alumnae studies using performance interviews. For the current study, we did use performance interviews to assess the competences of outstanding professionals. In addition, we employed performance characteristics inventories which enable a study of professional perceptions of the abilities, competences and behaviors descriptive of outstanding versus average performers. We selected the approach of Job Competence Assessment developed by McBer and Company (Klemp, 1978; McClelland, 1976) to build professional competence models, because the underlying definition of abilities or competences and principles of assessment most nearly matched that of the Alverno faculty.

Perspectives on Learning and Careering: Interviews and Careering Questionnaires

The outcomes of college also need to be described from the student's perspective. Clearly, development of college outcomes measures focused on abilities acquired during college and expected to be related to performance after college, that describe intellectual and personal growth across the life span, and performance assessment of professionals on-the-job, is just getting underway. Measures of cognitive-developmental patterns have been used primarily for research purposes, and measures of learning styles, while many and varied, have little experience as college outcomes measures.

It seemed imperative, then, to take a path initiated by Perry (1970) in the sixties, that of conducting open-ended interviews to discover how students experience college. We proposed conducting broad, in-depth longitudinal interviews with students to tap their perceptions, and to thereby gain some insight into the determinants of the outcomes of college from the student's point of view. We also expected to uncover some of the individual differences in learning patterns and the several paths that students take during college to achieve their goals. We hope to expand our understanding of who benefits from college and why, and what kinds of experiences characterize students in a performance-based or outcome-centered liberal arts curriculum. Further, the interviews could serve as a context for interpreting results from the human potential measures, and for seeking the links between abilities learned in college to those demonstrated after college. While some of these research goals go beyond those reported here, this approach is effective in raising further research hypotheses and for communicating the nature of student change to faculty.

We developed careering questionnaires to assess the students, alumnae and other professionals. These questionnaires allow collection of demographic data, information on paid and unpaid employment, careering history, and attitudinal information. Careering questionnaires also collect data on a range of variables that provide a context for the performance and perception studies of professionals.

Matching Frameworks and Measures to Curricular Goals and Assessment Principles

A primary reason for undertaking evaluation and validation studies of student outcomes in college is to inform continued curriculum development. This includes more clearly specifying outcomes, learning strategies, assessment techniques and evaluation methods. Educators are working to develop curricula that respond to the students' learning styles, that capitalize on the adult's range of experiences and that reflect what is understood so far about patterns of younger and older adult development and learning. But this effort will succeed only if we question the selection and effectiveness of current frameworks and corresponding college outcomes measures for college curricular settings.

Clearly, selection of frameworks, and corresponding instruments as external criteria or standards against which a college examines its ability to facilitate student growth is appropriate if there is: (1) a match between the goals and objectives of the college and the framework used, and (2) a match between the college's principles of assessment and the theory of assessment used to develop instrumentation based on the framework:

> Instruments which have been used for theory testing--even though they have demonstrated reliability and validity--need to be filtered first through the practitioner's goals, objectives, learning strategies and assessment processes. Once they emerge from this crucial dialectic, they may be effective program evaluation instruments as well (Mentkowski, 1980, p.28).

Therefore, our practice-based research using any of the measures to establish the validity of college outcomes needs to be understood in the context of their use. This context at Alverno College includes a philosophy of education, an outcome-centered curriculum and principles of assessment which have been in the process of development by Alverno faculty for over ten years (Alverno College Faculty, 1976, 1977, 1979).

DEFINING AND ASSESSING OUTCOMES AT ALVERNO COLLEGE

How Do We Define Outcomes?

Alverno's faculty are concerned with defining and assessing outcomes of college. The student's continual development is at the center of institutional goals. Thus, the major outcome of college is growth or change. Faculty expect college to be a significant and positive facilitator for student growth, and a catalyst for lifelong learning and development. Rather than thinking of college as a cause and student growth as an effect, growth is a result of the interaction between a self-directing individual who plays a role in initiating her own growth, and a learning process. Both faculty and student select and involve her in learning which challenges and supports personal change. The role as learner continues after college throughout the life span, and learning becomes a means by which she realizes her potential for professional development and personal growth.

This emphasis on growth of the person across the life span, for which college is a catalyst, determines what broad outcomes are identified. Yet any definitions of outcomes need to retain the breadth and complexity characterized by college-level learning and performance. The college takes responsibility for contributing to growth and development of lifelong learners, and for learning in college that continues after college. Such goals are broad, and a commitment to them provides a philosophical base for a faculty working collaboratively to develop a curriculum. But ultimately, a faculty needs to define these broad, more "intangible" outcomes of college if they are to teach and assess for them.

What Are the Abilities or Competences?

What are the developmental, holistic and generic abilities each student must demonstrate in order that faculty consider her a lifelong learner? At Alverno, the focus on outcomes took shape in 1971 when the faculty, in a yearlong series of intense faculty institutes, struggled to respond to the questions, "What should a student get out of spending four years with us?", "What kind of person did we hope she would become?" and "How are we helping it to happen?" As the year progressed, it became clear that a focus on outcomes a liberal education challenges the individual to develop, needed to be accompanied with questions about the definition of abilities, the nature of the learning experiences provided, and the way in which abilities--we called them competences--could be assessed (Alverno College Faculty, 1976). For the next two years, an academic task force synthesized the many abilities the faculty identified into eight general outcomes and defined each as an ability or competence. Each was then further defined via a sequential, increasingly complex set of six levels. The competences are:

- Communications
- Analysis
- Problem Solving
- Valuing
- Social Interaction
- Taking Responsibility for the Environment
- Involvement in the Contemporary World
- Aesthetic Response

All students are expected to progressively demonstrate levels 1 to 4 of each ability, usually by the end of the general education sequence. She then demonstrates levels 5 and 6 of those abilities most related to her major and minor areas of concentration.

Faculty have defined the meaning of each ability or competence, the sequence and increasing complexity of the competence levels, the relationship of each competence level to other levels and to other competences as well as the relationships across academic disciplines in the Faculty Handbook on Learning and Assessment (Alverno College Faculty, 1977). Instructional methods are suggested. Each competence level also describes the criteria for assessment, and suggests appropriate instrument stimuli and modes (with an emphasis on production tasks) for assessing performance. At Alverno, college outcomes are defined as abilities or competences considered to be complex processes. Faculty define abilities as developmental, holistic and generic (Alverno College Faculty, 1979).

Developmental Abilities

For an ability or competence to be developmental means that it is teachable. Thus, the ability or competence is broken open into sequential descriptions or pedagogical levels that describe increasingly complex elements and/or processes which are acquired by students over time as the result of instruction and where each level requires a more complex demonstration of the ability. Further, competences that are developmental continue to change after college, as additional learning experiences contribute toward developing greater complexity.

Holistic Abilities

For an ability to be holistic means that each developing ability involves the whole person. Complex abilities or competences include a behavioral component, a knowledge component, an affective or self-perception component, as well as a motivation or disposition component (Klemp, 1979). All or mo of the components of a competence or ability can be inferred from an observable demonstration or performance. Traditionally, colleges have required demonstration of only the knowledge component. When competences or abilities are defined holistically, then knowledge, skill, attitudes, self-perception and dispositional components are specified. Within a particular context, abilities or competences can then be defined as observable behaviors. These components are expected to become integrated, and together with other abilities, involve the whole person.

Generic Abilities

For an ability or competence to be generic means that the developing, holistic ability will transfer across situations and settings. Thus, abilities are defined as transferable. The kinds of situations to which abilities are expected to transfer include those a student encounters in exercising multiple roles. Generic abilities are expected to transfer not only to situations in college and work, but also to personal and professional situations after college. Generic abilities equip students with skills that transfer from one situation to another, across roles and positions within a particular occupation, and even across occupations.

Most students will ultimately be taking on different roles simultaneously. The abilities they acquire in college are expected to assist them not only in their professional roles, but in personal roles such as citizen, family member and parent after college. Professional roles, as well as the personal ones, continue to change and develop. Acquiring abilities that are developmental, holistic and generic assumes that students become learners in college and become self-directed in learning how to learn. Learning how to learn consists of learning strategies that make up the concept of "lifelong learner." We expect that our studies of student and alumna perspectives on learning and careering will help us define these broad concepts.

How Can We Develop These Abilities?

How can faculty develop these abilities in each student so abilities become internalized, integrated and generalizable? In 1973, the faculty implemented an "outcome-centered" curriculum and developed learning methods to teach toward the competences (Alverno College Faculty, 1977). The curriculum emphasized assisting the student to develop these abilities in ways that are unique to her own individual differences in learning style and how she conceptualizes learning. Learning strategies build on the theory of "experiential learning" (Doherty, Mentkowski & Conrad, 1978). The experiential dimensions of the curriculum have been expanded such that students in each of the 18 academic and professional departments are immersed in opportunities to experience the constraints of the work world by engaging in mentored off-campus experiential learning (OCEL) where transferring abilities learned in college is paramount. Classroom learning experiences likewise focus on student involvement in learning situations where concrete experiences, reflection, conceptualizing ideas and concepts, and plans for action are tested out in new performance situations (Mentkowski, O'Brien, Cleve & Wutzdorff, 1983).

How Will We Know a Student Has Achieved These Abilities?

How will faculty know a student has achieved these abilities or competences according to their prescribed criteria or standards? The assessment process developed by the Alverno faculty has been described elsewhere (Alverno College Faculty, 1979), and represents one of the more recent directions in reconceptualizing assessment (Willingham, 1980). The assessment process is patterned in part on assessment center technology (Moses & Byham, 1977). Alverno relies on volunteer assessors from the Milwaukee business and professional community to judge effective student performance, as well as the faculty who design instruments and judge performance both in the Assessment Center and through courses.

Four fundamental principles of assessment are specifying criteria, relying on multiple judgments, choosing from alternate performance modes so as to elicit the full range of the developing ability, using expert judgment to infer student abilities from this performance, and providing the student an opportunity for self-assessment.

Criteria

Once outcomes are defined as abilities or competences, assessing for them means defining the criteria for judging student performance. Thus, faculty have defined abilities or competences not only by the competence levels, but also by specifying assessment criteria.

An important characteristic of assessment is that of evaluation of student performance in relation to criteria or standards (criterion-referenced), in contrast to students performing relative to norms (norm-referenced) created just from the range of performance of other students. While standards are informed by the range of student performance, they are also open to input from other sources (e.g., descriptions of abilities or cognitive patterns from theories of learning and development; abilities that characterize effective professional performance).

Identifying appropiate criteria or standards is a difficult task and worth a research agenda of its own (Glaser, 1981). The results reported in this paper are intended to assist faculty with this task.

An issue that arises when specifying criteria is the relationship of the criteria to the abilities one is measuring, and also the relationship of those abilities to broad and inclusive college outcomes such as "lifelong learning," "reaching one's full potential," "becoming an independent learner," "developing critical thinking" and "learning to learn." Abilities students must perform in order to graduate, as defined through assessment criteria, can be distinguished from broad outcomes that are more intangible. Educators may agree on these more intangible outcomes and may consciously use them as frameworks in teaching. They may even assess for them diagnostically in many ways. And faculty have used these outcomes to select external criterion measures to validate the outcomes of college. But educators do not demand evidence from student performance assessments in order to graduate students, nor do faculty guarantee such outcomes.

Specifying criteria for assessment is a faculty effort to make the more intangible outcomes of college, and defined abilities or competences, operational. Faculty work to identify both specific and broad criteria for judging student performance at a particular competence level. For each broad ability to be assessed, faculty must make the ability explicit through criteria so students can understand what performance is required. Therefore, faculty need to describe the ability sufficiently through criteria statements such that it can be reliably and validly assessed. At the same time, the complexity of the abilities assessed limits how explicitly these criteria are stated. Criteria for assessing student performance of abilities fall on a continuum from broad to specific. Thus, assessment calls for multiple, expert judgment by faculty.

Multiple Judgments

Alverno faculty also recognize that any one sample of student performance is just that--a sample of what the student is able to do in a given context, in response to a particular instrument stimulus. Consequently, Alverno faculty rely on multiple judgments. This means observing her performance cumulatively, in a number of contexts, across a number of settings, across time, and across a variety of performance modes.

Alternate Performance Modes

An important challenge in defining criteria for assessment is to require that students demonstrate not only the knowledge component of abilities, but also demonstrate the behavioral, dispositional and self-perception components. Learning to do as well as to know puts the emphasis on learning how to perform, and requires that the performance mode match, as nearly as possible, the ability being assessed.

Because of the complexity of the competences being assessed, faculty design instruments complete with stimulus and performance mode (and criteria) that elicit to the fullest extent, the student's developing ability. Thus, Alverno faculty have committed themselves to designing assessment techniques that employ production tasks rather than recognition tasks. That is, the student is required to generate a response to an instrument's stimulus, rather than simply to indicate recognition of information. Consequently, faculty are likely to employ performance modes such as essay, group discussion, oral presentation, interview, and in-basket, rather than modes such as multiple choice, short answer, true-false, etc. Performance modes are designed requiring the student to demonstrate behavior similar to the ability as usually expressed rather than an artificial mode (e.g., to demonstrate Social Interaction skills, she would perform in an actual group discussion).

Expert Judgment

Use of production tasks requires expert judgment, defined as special knowledge or skill ("expertise") that the assessor brings to the judging situation and applies in a rigorous or disciplined way. In the context of higher education, where faculty teach toward sophisticated abilities, complex cognitive structures, and highly skilled performances, faculty are accustomed to the use of expert judgment in instruction and assessment. Expert judgment, which involves the use of inference in abstract analytical thinking, is basic to assessing student performance at advanced levels. Expert judgment is a practical instructional and assessment tool and is in constant use by faculty in higher education who insist on production tasks to assess performance. A treatment of issues surrounding the use of expert judgment can be found in Mentkowski, Moeser and Strait (1983).

Self-Assessment

Self-assessment, or student assessment of her own performance, her perceptions of the extent to which her performance meets criteria, is an important component of the assessment process. Assessment provides a challenge that assists the student to take responsibility for her own learning, to assess herself, and to become more self-directed.

Assessment of student performance leads to evaluation and revision of instruments and clarification and further development of criteria for assessment. Faculty work to continually clarify and develop criteria so as to specify both specific and generic criteria for credentialing student performance.

These characteristics of assessment are important to recognize because they have implications for the selection of external criterion measures for validating the faculty defined outcomes of college, and for realizing our project objective to validate Alverno assessment techniques.

What Are Student Outcomes of the Learning Process?

Since outcomes are very generally defined as growth or change, and are visible as change in performance, ability or competence definitions communicate what the student does or performs, rather than what the faculty does or performs. Note that college outcomes include self-assessment, or change in the student's perception of herself as a learner and as a growing, changing individual. In addition to student performance, student perceptions are equally valuable outcomes of college.

What Are Alumnae Future Outcomes?

Because faculty define college outcomes in relation to the student as lifelong learner, faculty also seek to define future outcomes, to attempt to "see" and conceptualize outcomes that develop from those demonstrated in college. Future outcomes help provide a picture of abilities as they appear "full grown." They orient faculty toward defining outcomes of college in ways that describe the beginning of abilities as they are taught in college, in relation to those graduates will need five, ten or even twenty years after college. Abilities needed for the future are built on abilities taught in college. Analytical thinking expressed by deriving a hypothesis from a set of interrelated studies for a biology class may be quite different from the inductive, problem finding analysis an environmental specialist uses on the job. College must educate students for the future, not just for the present. Analytical thinking defined for college learning must be related to post-college roles to ensure future personal and professional outcomes. Yet we know very little about what those relationships are.

Future outcomes also include student expectations for realizing career and professional opportunities, expectations that an investment in college will contribute to adequate preparation for performing in professional situations, realization of self-fulfillment, and an enhanced quality of life. Beyond student expectations, faculty expectations for students include an expanded role as a learner who can make the transition from college to work and to life after college. Faculty want students to become self-directed learners and to work toward achieving personal and professional goal integration (Earley, Mentkowski & Schafer, 1980).

What Are the Components of a Learning Process?

The six questions underscored above are repeated in Figure 1, a graphic of faculty questions and learning process components. They set the stage for the development, in 1976, of the faculty focus on establishing the validity of the outcomes of college.

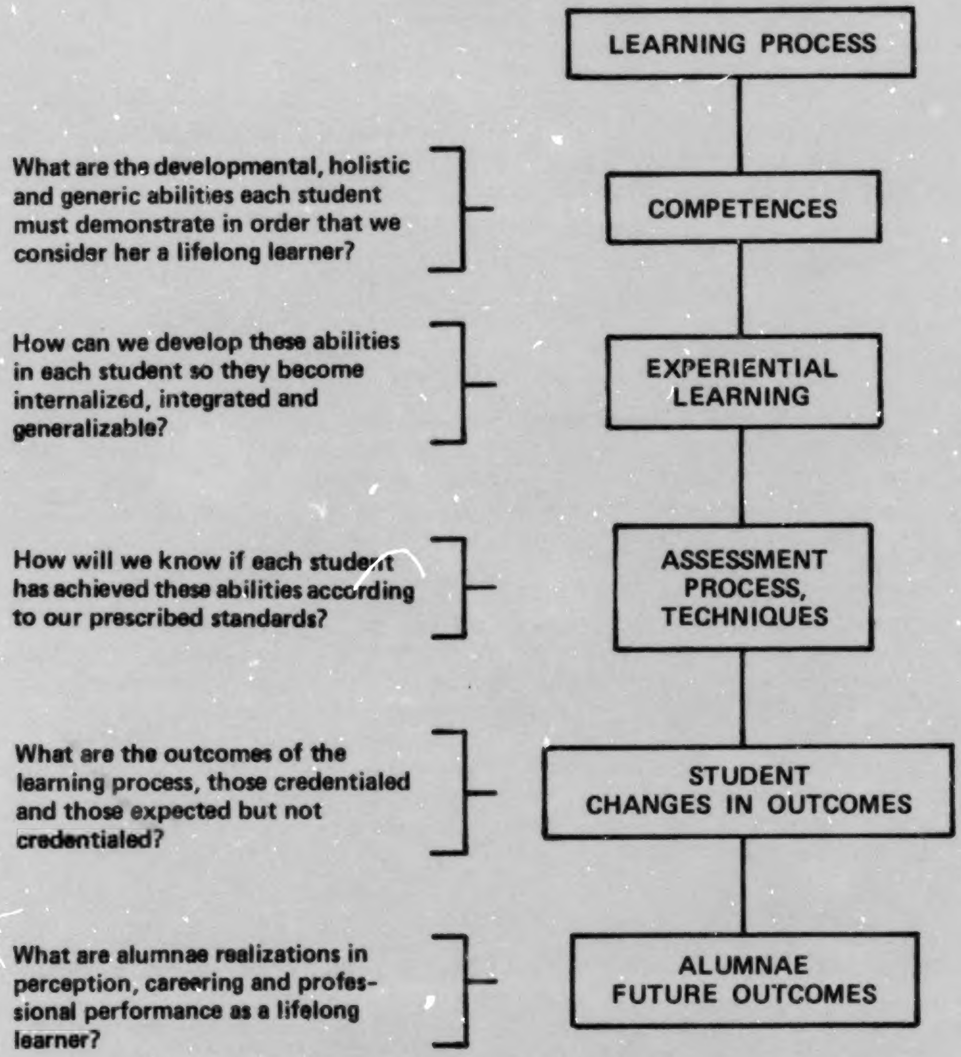

LEARNING PROCESS
What are the developmental, holistic and generic abilities each student must demonstrate in order that we consider her a lifelong learner?
COMPETENCES
How can we develop these abilities in each student so they become internalized, integrated and generalizable?
EXPERIENTIAL LEARNING
How will we know if each student has achieved these abilities according to our prescribed standards?
ASSESSMENT PROCESS, TECHNIQUES
What are the outcomes of the learning process, those credentialed and those expected but not credentialed?
STUDENT CHANGES IN OUTCOMES
What are alumnae realizations in perception, careering and professional performance as a lifelong learner?
ALUMNAE FUTURE OUTCOMES

Figure 1. A description of Alverno learning process components.

ESTABLISHING THE VALIDITY OF OUTCOMES

Validation studies can be an important source for insight about how human beings learn and develop. Educators are urgently seeking the best available frameworks for understanding what and how their varied students learn, which experiences stimulate and enhance that learning, and how that learning fits into the tasks of lifelong growth. Such studies are also designed for verification demanded by the need for accountability. Basically, validation helps to focus four kinds of questions which are asked by educators as well as by the constitutencies they serve:

- Descriptive questions: "What is occurring?" "How is it occurring?"

- Ascriptive questions: "Why is it occurring?"

- Evaluative questions: "Is what is occurring 'good' compared to a criterion or standard?" "Is the standard valid?"

- Prescriptive questions: "What should be occurring?"

As the new science of program evaluation has emerged, it has become apparent that existing resources for establishing validity (e.g., American Psychological Association, 1974) are not sufficient to the task of validating developmental outcomes. Nor is the controlled-experiment model on which these approaches are predicated either appropriate or possible in a dynamic, interrelated practice setting (Bryk, 1983; Cronbach & Associates, 1980; Parlett & Hamilton, 1976).

Like several other investigators (Grant, Note 2; Messick, 1980; Popham, 1978), we have therefore opted for a validation approach geared to the unusual complexity of the learning outcomes involved in college, as well as to the fluidity of program and population that characterize college instruction. Several features represent our attempt to respond more effectively to the constraints and opportunities of validating developmental outcomes in a dynamic program.

In education, a main criterion for demonstrating validity is showing that changes in student performance over time occur as the result of college. In contrast, the validity of the end product alone rather than how it developed, can be important in noneducational settings. In the work world, employers may only be interested in selection or retention of employees or in the extent to which a candidate for promotion can demonstrate an ability, not how or whether the ability was acquired at the organization or whether the ability can or should be taught.

The way in which a person acquires an ability is critical for educational programs. How persons learn, and how they develop outcomes is important information for enhancing the quality and effectiveness of programs. What causes change? If college can be said to facilitate change in student performance, then the learning process can be said to be valid.

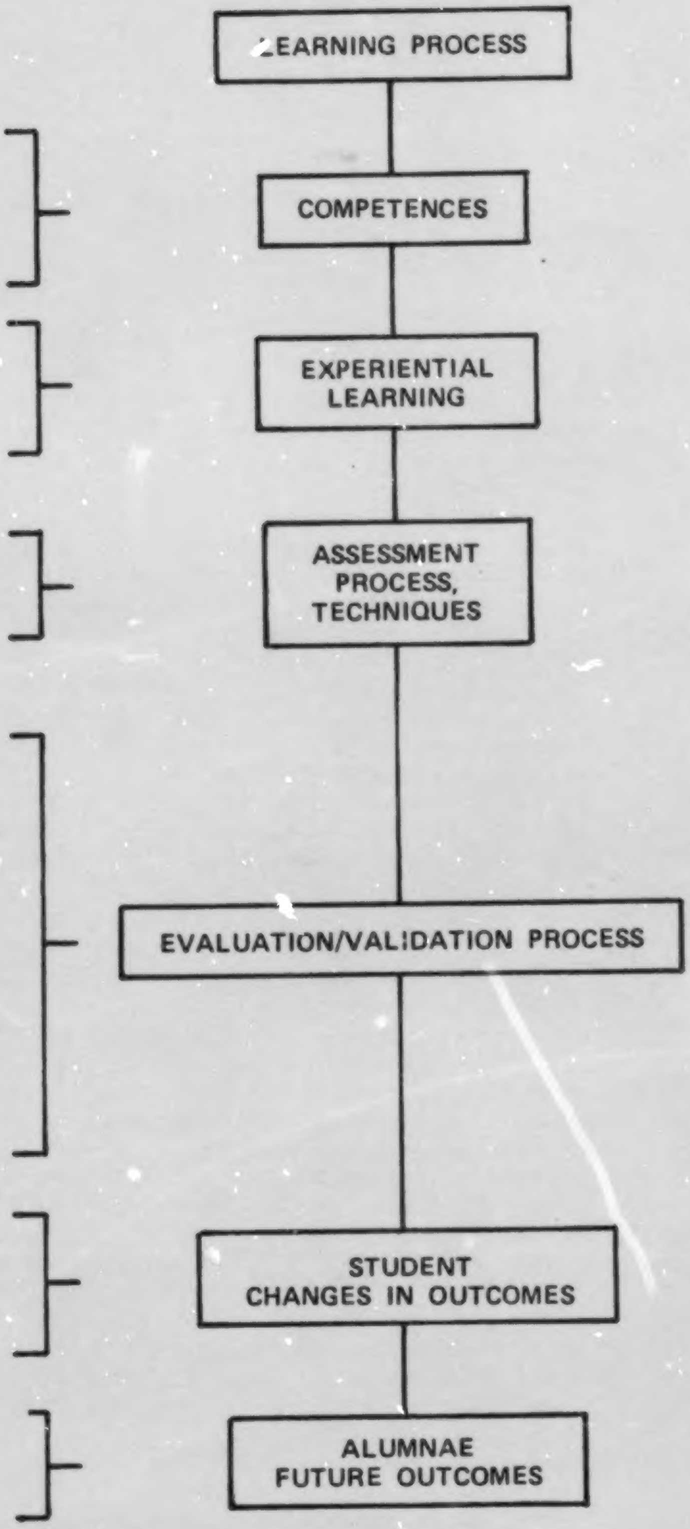
Establishing Evaluation/Validation as a Component of the Learning Process

In 1976, Alverno faculty made a commitment to establish the validity of outcomes. They identified several major questions as their initial thrust, and we designed an eight year plan for carrying out the research objectives operationalized from these questions (Mentkowski, 1977b).

To carry out these research questions, the faculty first created a context for validation by establishing evaluation as a concept and function, and created an Office of Research and Evaluation. Evaluation/validation is thus a part of the learning process (Figure 2). Establishing evaluation/validation as a curricular component led to the identification of the following five research questions. They are:

- Are the competences and assessment techniques of the learning process valid?
- How do students change on college outcomes described by their potential for cognitive development, learning styles, and generic abilities?
- Are outcomes mirrored in students' perceptions of their learning and abilities?
- How do outcomes learned in college relate to lifelong learning, abilities, careering and professional development after college?
- What competences describe the performance and perceptions of outstanding professionals?

Each of these questions was operationalized via an overall validation design, complete with specific questions, designs, instruments, and methods so a more systematic validation of outcomes could occur. During the past seven years, from 1976-1983, these questions have been researched with support from Alverno College and from a three year grant from the National Institute of Education.


LEARNING PROCESS
COMPETENCES
EXPERIENTIAL LEARNING
ASSESSMENT PROCESS, TECHNIQUES
EVALUATION/VALIDATION PROCESS
STUDENT CHANGES IN OUTCOMES
ALUMNAE FUTURE OUTCOMES

What are the developmental, holistic and generic abilities each student must demonstrate in order that we consider her a lifelong learner?

How can we develop these abilities in each student so they become internalized, integrated and generalizable?

How will we know if each student has achieved these abilities according to our prescribed standards?

Is the learning process we use to develop and assess for abilities actually working the way we have designed it?

Are changes in performance of student outcomes related to college instruction? What is the relationship between current outcomes and future outcomes?

How do current and future student outcomes compare against internal and external standards?

What are the outcomes of the learning process, those credentialed and those expected but not credentialed?

What are alumnae realizations in perception, careering and professional performance as a lifelong learner?

Figure 2. A description of Alverno program components with evaluation/validation process.

A main outcome of the research is the overall approach to validating outcomes that emerged from researching the five objectives. It is appropriate here to describe this approach, the features of our attempt to validate outcomes, and the overall validation design to provide the context for the ten research reports that follow this overview and summary.

Identifying Assumptions About Validity

During our ongoing dissemination of the issues and early results described in this report, many of our colleagues in higher education were interested in a broad overview of how we conceptualized validating a liberal arts, outcome-centered curriculum as a first step in thinking about the validity of their own programs. In order to define "validity" as a concept and create a framework for establishing validity of abilities learned in college, and to communicate this to our colleagues, we set forth our assumptions about validity that were identified as we researched the five questions stated above.

Validation Is Developmental

When we create programs, we assume that the program will continue to develop. We recognize that most educational programs are undergoing various changes, and that new programs have start-up time and may then undergo periods of maintenance. But if a program is dynamic and responsive to students, further change will continuously occur.

Where a program is in its development is critical to the types of strategies used to demonstrate its validity. The kinds of internal and external criteria or standards to which a program is held depends on the extent to which faculty have defined outcomes and are able to assess them, the availability of information from which standards can be drawn, and also on how long the program has been in operation. It is hardly conceivable to fault a program for not having related student outcomes to future outcomes if the program is new and does not yet have alumnae with extensive post-college experience. If faculty define competences or abilities (rather than grade point average or subject area tests) as outcomes, and few theoretical frameworks for understanding these competences exist, one cannot fault them for not establishing construct validity. If there are no tested measures of college outcomes available, one cannot fault them for selecting new and untried measures as external criterion measures.

Thus, the kinds of validation questions and issues that can be addressed by a faculty concerned with validating outcomes is limited to a degree by how far the faculty has come in conceptualizing and implementing the curriculum, and by what measures are available for comparison. This is an especially important consideration in validating performance-based liberal arts curricula since they are generally of recent vintage. Indeed, our own attempt to begin validation research coincided with the anticipated graduation of our first students from our performance-based curriculum, three years after its implementation.

Validation Is an Illuminative, Diagnostic Process

Establishing the validity of college outcomes is never "finished." Since programs change and continue to develop one cannot and should not consider a program ever completely validated. Further, validation strategies are applied to a complex system. Each aspect or level in the system is interrelated with another aspect and level, and every change changes everything. As validators, we face a considerable challenge in trying to weigh the effectiveness of such integrated environments and their elements. Couple this with an increased emphasis on standards rather than normative comparisons, and it is clear we face an enormous complexity in validating outcomes. How we approach this complexity--our "mindset"--will impact our ability to influence the future evolution of higher education (Mentkowski, 1980). Because of the complexity of context of most programs in higher education and the complexity of abilities and outcomes toward which one is teaching, validation efforts cannot "prove" validity, but can illuminate the quality and effectiveness of programs and the extent to which changes in student outcomes are related to future outcomes.

To justify the amount of time, effort and resources required for validation research, results must be diagnostic. Validation results must be usable to improve programs and to continually add to the insight faculty bring to teaching, learning and assessment issues. Establishing validity means to continue, throughout the life of the program, to engage in efforts to bring one closer and closer to realizing program goals and objectives, which also change.

Validation Relates Theory to Practice and Research to Evaluation

When Lawrence Kohlberg initiated the Just Community approach to schooling, he made the leap from theory to practice. This step allowed a test of concepts emerging from his theory and research studies, and contributed to their credibility for the educational world. Some years after this leap to practice, Kohlberg confessed to the "psychologist's fallacy" (Kohlberg, 1979, in Hersh, Paolitto & Riemer, 1979) of assuming that developmental theory as exemplified by stages of development could or should form the most important cornerstone of educational practice. This theorist's fallacy has its counterpart in the "researcher's fallacy," in which we are tempted to assume that the goals, methodology and instrumentation that are characteristic of research studies seeking theory development and demonstrating cause-effect relationships should form the cornerstone of an approach to the practice of evaluation and validation.

While many program evaluation studies in current literature seem to depend almost entirely on the techniques of the researcher, evaluation has begun to emerge as a separate discipline. Evaluators have evolved strategies that clearly recognize differences between the purpose of research studies and those of evaluation, and have created alternate approaches (Bryk, 1983; Parlett & Hamilton, 1976). This development, as well as the growing recognition that practitioners are equal partners in creating theory and practice (Mosher, 1977), sets the stage for avoiding the "researcher's fallacy."

A mindset for program evaluation thus begins with the awareness that evaluation goals and strategies are better selected and derived from the practitioner than from the theorist. The question is not "What is available that we can use to validate?" Rather, "How might we best analyze the special characteristics of this curriculum so that our validation objectives match the nature of the specific program? What is the relationship between tools for assessing broad outcomes of college and instruments that assess the defined abilities from a program?" In the previous section we have described Alverno's curricular goals and theory of assessment so that a rationale for selecting the frameworks and instruments we used to validate outcomes could be critiqued. One projected result of this move from theory-to-practice and from research-to-evaluation is that we seek to investigate questions suggested by practitioners, and to consider the context in which validation is attempted.

Validation Is Contextual

Earlier, we commented on the importance of recognizing validation as a developmental process that walks hand in hand with the program its methods are applied to. Clearly, the context in which validation research is conducted has several important implications for validation designs and strategies.

First, we conceptualize validation in an ongoing, changing curriculum where the object of study does not "hold still." Second, validation goals and objectives need to be derived from through the validation process. The philosophy underlying the curriculum, beliefs about how students learn, and student and faculty roles impact the kinds of validation objectives and strategies that can be employed. This need not be taken as a negative constraint. Rather, if we are to avoid the researcher's fallacy, then "validity" of validation strategies means that we design validation goals and strategies within the context of a particular setting. The press of the setting can often serve as a guidepost and beacon in validating nontraditional outcomes. We benefit from such an approach later when results from validity studies are ready to be discussed, critiqued, and ultimately implemented.

Third, the design for validating outcomes needs to flow from the structure characteristic of the context. Validating outcomes cannot be successfully initiated if the way in which outcomes are defined is not considered. Involving faculty and students in validation strategies cannot occur unless expectations set for their involvement are apparent in the program itself. For example, students who come to understand the need for multiple assessment of their abilities are more likely to understand why they are asked to perform on other than faculty designed measures (Mentkowski, 1979). Again, rather than being perceived as a constraint, the context should be seen as the source for design and implementation guidelines. The "validity" check of the context is an important indicator of the extent to which the results from validation studies are those that are both true and useful.

Defining Validity

Establishing the validity of programs is a relatively new concept. Sets of standards (Rossi, 1982) for conducting program evaluations have been formulated, and these standards contain some operational advice. The evaluation research community has edited a number of volumes to aid colleagues. But this thrust has been a recent development.

One source of definitions of validity is set forth by the measurement community for instrument validation. These types of validity have become one way in which the field of educational measurement can identify measurement techniques that will yield valid, reliable scores from which valid inferences can be drawn. These standards define validity as establishing content validity, face validity, construct validity, criterion-related validity, predictive validity and discriminant validity (American Psychological Association, 1974).

Since the advent of performance-based education, with its emphasis on criterion-referenced measurement, organizing

Since the advent of performance-based education, with its emphasis on criterion-referenced measurement, organizing validation efforts around these types of validity has proved difficult (Grant, Note 2; Messick, 1980; Popham, 1978). When first faced with these issues in 1976, we attempted to simply modify the existing types of validity (content, face, construct, criterion-related, predictive) to fit the outcomes and assessment techniques we were validating. That attempt failed. The purposes and characteristics of instruments have changed, and we now need assessment techniques designed to measure abilities which consider the role of assessment techniques and processes in the teaching/learning process, the need for demonstrating the equity of the instrument and the importance of giving feedback to students. Governance questions related to who decides on criteria and standards are also an issue. Often, we do not have a clear picture of the complex constructs we are trying to measure. They are often developmental constructs, and we expect change. Test/retest reliability is therefore not a goal. Nor do we expect that abilities developed in college will have a straight line prediction to how they are demonstrated after college or even how they are defined. We are interested in developing abilities. Prediction to success in college is not as important as having diagnostic information on which to build instructional practice. Other issues relate to effective approaches for establishing the validity of programs, assessment techniques and outcomes which focus on the need for evaluation as well as validation efforts, and which consider the contextual, developmental and illuminative nature of programs (Weiss, 1983). We soon came to realize that we needed to rethink validity based upon our new assumptions about its use and function. Faculty questions provided the framework for designing a validation model and creating validation strategies. The nature of the questions and their relationship to various aspects of the learning process model (competences, experiential learning, assessment process and techniques) will be discussed in the next section.

Out of this experience, we have come to think of two types of validity, design-based validity and performance-based validity. With design-based evaluation and validation strategies in place, the research results from performance-based validation strategies are more likely to be incorporated into program development efforts. If a program is constantly changing and assessment techniques consistently revised, new information has a place to go--a place to begin to be tested in the practical context from which it arose. For each of the two types of validity, we later specify the nature of the questions asked by faculty, which determine comparisons against internal criteria or standards and those external to the program, and how these comparisons will be effected.

Design-Based Validity

Design-based validity has its basis in criteria which faculty use to define competences, develop learning strategies, and design an assessment process (Figure 1). But as every curriculum designer knows, what looks good on paper needs adjustment and monitoring to make it work in actual practice. Program review and monitoring procedures are critical to establishing design-based validity. But how does one know a program is meeting these goals? Design-based validity refers to those strategies that monitor program function and compare the program against criteria or standards evoked during program design ("What is occurring? How is it occurring? What should be occurring?"). Both internal and external criteria or standards about how program components should be designed are used to answer the question "What should be occurring?" both during design and implementation. For example, identifying competences, learning strategies and an assessment process evolved from the expert judgment of faculty (internal criteria or standards) who had vast experience teaching and assessing students. Faculty drew on this experience to create the various components of the learning process. For example, one design criterion or standard for defining competence is that competences be defined as developmental, holistic and generic. A criterion or standard for developing assessment techniques is that the performance mode be similar to the ability as it is usually expressed. The corporate faculty pooled their resources as designers. Thus, one source of criteria or standards is the expert judgment of the faculty.

Design-based validity does not necessarily rely entirely on faculty judgment based on their own criteria or standards. Criteria or standards from outside the college (external standards) are drawn from various sources. For example, professional groups were consulted on the definition of abilities. Expectations about the nature of the abilities needed in personal and professional roles of graduates (future outcomes) were also discussed. Literature reviews were also used.

A program can be said to have design-based validity when the comparison between what is intended and what is actually happening on a day-to-day basis at any one point in time is realized. This comparison is effected through a variety of review procedures carried out in relation to various aspects of the curriculum (e.g., Assessment Committee evaluates instruments; syllabi are submitted for review; external assessors from the Milwaukee community judge student performance and critique the assessment process) (Mentkowski, 1980).

Performance-Based Validity

Design-based validity alone can be tautological. Even though designers and implementors consult outside resources, there is a need to measure program outcomes. In our case this means the performance of students. Performance-based validity refers to the strategy of reviewing student performance of outcomes as it develops through instruction rather than comparing how the program functions against internal and external criteria or standards ("What is occurring, how is it occurring, why is it occurring?"). Validity rests on whether student performance changes over time as the result of instruction, and whether these changes persist beyond college. At the same time, one cannot stop there. "Is the change in student performance 'good' compared to a standard?" is still an important question.

Thus, changes in student performance need to be compared against criteria. For example, suppose that a study of student performance shows change on a faculty designed measure of analysis. The faculty can ask, "How does the range of performance compare with how we have defined the ability (internal criterion or standard)?" They may also ask "How do students perform on an external criterion measure of analysis developed by this researcher of analytical thinking?" or "How would professionals in management demonstrate analysis, and do our students show the beginnings of this ability as expressed on-the-job?" (external criteria or standards).

One of the first questions we must deal with in measuring outcomes and future outcomes is the identification and source of criteria to which outcomes will be compared. The basis for establishing validity is comparison. But what should comprise the nature of the comparison? Whose standards, and what kind of standards are adequate? The search for standards to which program and student outcomes can be compared is a continuing one. In the section "Defining, Assessing and Validating Outcomes in Higher Education," we pointed to the lack of frameworks and measures available for use as standards to which a college's outcomes could be compared. We have chosen those frameworks and measures more likely to meet certain of our own criteria for outcomes and measurement techniques. Yet, we recognize that choice or selection of any criteria--whether a measure of cognitive development, a set of abilities that describe professional performance at work, a set of norms based on a range of student performance, advice from a group of external assessors, or goals from program designers--is somewhat arbitrary. We deal with this question by using a variety of approaches to establishing validity, using a variety of criteria or standards from sources both internal and external to the learning process, and the performance of our students.

However, faculty selecting a standard should consider its representativeness or the extent to which the standard is inclusive of the interest group. Second, a standard should be valid. To what extent is the external standard meaningful? If both these questions cannot be answered to one's satisfaction, the external standard itself may need to be validated before including it in a validation study. Thus, types of criteria or standards include those developed by faculty as well as those identified outside the institution.

In addition to focusing on questions about changes in student performance over time, performance-based validation strategies examine the relationship between the program and student performance. This comparison allows us to determine the effectiveness of the curriculum, or rather, the interactions between the curriculum and change in student performance. This comparison is effected by observing changes in student performance over time in relation to educational experiences (instruction). The results of design-based validation studies are thus further challenged by performance-based validation strategies, just as the results of studies of changes in student performance are further challenged by comparison to external standards.

Thus, the true test of a program (design-based validity) is its relationship to changes in student performance over time (performance-based validity). And the true test of student performance is to examine how student performance changes over time in relation to educational experiences, and whether these changes persist beyond college. Ultimately, both the degree and type of change in student performance of outcomes over time is compared to internal and external standards.

Making the shift from the traditional types of validity to design-based and performance-based validity helps to conceptualize validity given the assumptions that have been previously specified about its role and function. Validity is developmental, a process, considers theory-practice, research-evaluation relatedness, and is contextual. Strategies for establishing performance-based validity are ongoing. In a continuously changing program, design-based validity is also ongoing. Redesign is often concurrent with attempts to establish performance-based validity. We cannot expect that a faculty carry out performance-based validation strategies on alumnae until there are graduates, nor can a faculty validate criteria for assessment until outcomes have been identified and defined. In general, however, attempts at performance-based validity will be simultaneously attempted with design-based validity strategies.

In some ways this is an advantage. As stated earlier, with designed-based evaluation and validation strategies in place, the research results from performance-based validation strategies are more likely to be incorporated into program development efforts. If a program is constantly changing and assessment techniques consistently revised, new information has a place to go--a place to begin to be tested in the practical context from which it arose.

Identifying Validation Questions

As stated previously, our assumptions about validation and our definition of validity arose from questions faculty began to ask as they designed, implemented and tested the curriculum against student perceptions and performance. In an ongoing curriculum these questions continue to be asked, since it is unlikely that a changing curriculum will ever be validated in an absolute sense, nor do we think it should be.

Earlier, we categorized questions into four general kinds:

- Descriptive questions: "What is occurring?" "How is it occurring?"
- Ascriptive questions: "Why is it occurring?"
- Evaluative questions: "Is what is occurring 'good' compared to a criterion or standard?" "Is the standard valid?"
- Prescriptive questions: "What should be occurring?"

Establishing design-based and performance-based validity means applying these questions simultaneously to the curriculum components and to student performance of current and future outcomes. Asking descriptive questions implies observation and measurement of changes in student performance over time. Asking ascriptive questions implies establishing relationships between various curriculum components and current and future outcomes. Asking evaluative questions implies a comparison between curriculum components and student performance of outcomes, to internal and external standards, and asking if those standards are valid. Asking prescriptive questions implies implementing research findings to improve current understanding of student needs and curriculum practice. Because the questions are applied in an ongoing and changing curriculum, there is a need for investigating all four types of questions simultaneously. In order to respond to these questions, faculty created an additional component of the curriculum in addition to competences, experiential learning and assessment process. This component is called evaluation/validation process and techniques (Figure 2). In order to establish design-based validity, the faculty created internal review, evaluation and revision mechanisms at the same time as the program was designed.

An Office of Research and Evaluation was created three years after program implementation to establish performance-based validity. Faculty questions that stimulated the more systematic performance-based validation research through the Office of Research and Evaluation can be categorized with reference to the curriculum component against which it is applied (competences, experiential learning, assessment process, student outcomes, future outcomes), and whether the criterion or standard to which the outcome is compared is more likely to be internal or external.

Faculty Questions for Establishing Validity

Validation of Competence Compared
to Internal Criteria or Standards

- Are our assumptions about the complex nature of each competence adequate? How best should the ability be defined so that its meaning is clear? Have all aspects of the ability been defined?
- Are the competence levels actually sequential? Is one competence level necessary in order to demonstrate the next level?
- Is each competence level more complex than the previous one? Does the next level appear more complex only because it is integrated with more complex content?
- Have all the significant relationships between the competences been identified?
- Are aspects of an ability or competence common or generic to each discipline identified and measured?

Validation of Competences Compared
to External Criteria or Standards

- What competences do professionals perceive as critical for outstanding performance, education and selection?

- What competences do effective professionals perform?

- How do professionals describe their careering and professional development?

Validation of Experiential Learning Compared to Internal Criteria or Standards

- Do learning experiences reflect the basic tenets of experiential learning in both classroom and field experiences?

Validation of Experiential Learning Compared to External Criteria or Standards

- What gains or changes in performance do students demonstrate as a result of the learning process?

- To what aspects of the learning process do students attribute their development?

Validation of the Assessment Process Compared to Internal Criteria or Standards

- Are criteria used to judge performance in relation to the competences valid?

- Is the instrument stimulus and mode of assessment appropriate?

- Are the judgments of performance reliable?

- Do assessment techniques measure the effects of instruction?

Validation of the Assessment Process Compared to External Criteria or Standards

- How does the assessment process compare to assessment center standards?

Validation of Changes in Student Outcomes Compared to Internal Criteria or Standards

- What is learning to learn?
- How do students learn to learn?
- How do students learn to learn from experience?
- How do students learn to learn on the job?
- What are the learning outcomes or processes each student is able to demonstrate? Are outcomes defined in ways that reflect what we understand about students and the development of the abilities?
- How do abilities or competences develop?
- To what extent are abilities or competences developmental? Are they teachable?
- To what extent are abilities or competences holistic? Are they internalized and characteristic of the person?
- To what extent are abilities or competences generic? Do students generalize their performance across time and situations?

Validation of Change in Student Outcomes Compared to External Criteria or Standards

- How do students change on college outcomes described by their potential--what is possible for them to achieve?
- How do student outcomes compare with outcomes from students at other colleges?
- How are outcomes we assess for mirrored in students' perceptions of their developing abilities?
- How are outcomes, abilities or competences achieved in college causally related to effective performance of professionals at work?

Validation of Future Outcomes Compared to Internal Criteria or Standards

- What are the future outcomes, abilities or competences alumnae demonstrate in their professional performance?
- How are alumnae outcomes we identify mirrored in their perceptions of their developing abilities?
- How do alumnae transfer abilities to life after college?
- How is lifelong learning characterized?
- How do alumnae demonstrate careering and professional development?
- How do alumnae relate personal and professional roles?

Validation of Future Outcomes Compared to External Criteria or Standards

- How are outcomes learned in college related to graduates' future personal and professional performance?
- How do alumnae future outcomes compare to those demonstrated by outstanding professionals?

RESEARCH OBJECTIVES AND REPORTS

Questions faculty asked about the validity of college outcomes were operationalized into research objectives within an overall validation model. The model included specific questions, designs, instruments, and procedures so the more systematic validation of outcomes might occur. While we argued that faculty questions are researched simultaneously to a degree, we also realize that validation is developmental, and that it will be carried out within a particular context. We are, therefore, selective in carrying out a program of research which may be directed to most, but not all, components of the validation model at a particular time.

The assumptions and faculty questions presented so far in this report contribute directly to the research objectives specified in the prior reports to the National Institute of Education for the grant "Careering After College: Establishing the Validity of Abilities Learned in College for Later Success" (Mentkowski & Doherty, 1977, 1979, 1980a, 1980b). These research objectives are:

To internally validate the competences and assessment techniques of the Alverno learning process by--

I. Seeking to establish the validity of the techniques used to assess student performance by adapting or developing validation techniques appropriate for use with nontraditional assessment instruments;

II. (a) Comparing student performance across and within competences to further refine the nature of the competences and their interrelationships;

(b) Examining the relationships between student performance and external criterion measures.

To externally validate the student outcomes of the Alverno College experience by--

III. (a) Comparing the competences identified by Alverno with the competences demonstrated by outstanding professionals;

(b) Following the future careering of our graduates in their various professions after college;

IV. (a) Generating in-depth profiles of student perceptions of themselves and their development and analyzing the relationship of these perceptions to Alverno's learning process;

(b) Assessing student attitudes toward the learning process;

V. (a) Assessing students on cognitive-developmental outcomes identified as descriptive of individuals who have reached various levels of potential in ego, moral, and intellectual development;

(b) Assessing students on generic competence external criterion measures that assess a variety of analytic and interpersonal abilities.

The ten research reports that comprise the full report respond to the objectives as initially stated. The more specific questions that followed from these objectives have been stated earlier. They are formulated to best communicate results to the more general higher education audience.

Therefore, the five questions listed below structure the complete report.

- Are the competences and assessment techniques of the learning process valid?
  (Objectives I and II above)
- How do students change on college outcomes described by their potential for cognitive development, learning styles and generic abilities?
  (Objective V above)
- Are outcomes mirrored in students' perceptions of their learning and abilities?
  (Objective IV above)
- How do outcomes learned in college relate to lifelong learning, abilities, careering and professional development after college?
  (Objective III, b)
- What competences describe the performance and perceptions of outstanding professionals?
  (Objective III, a)

Each of these five questions is related to one or several of the faculty questions listed previously. At the same time, each represents a separate, involved research approach. The relationships between each of these approaches are apparent from the previous section. We will later provide links between the conclusions we draw from each of the five research thrusts, and describe implications for validating the outcomes of outcome-centered liberal arts curricula.

So that the reader may relate these questions to the components of the validation model presented next (Figure 3), each of these five questions is listed again, with the questions that form the basis for each study.

Question I
- *Are the competences and assessment techniques of the learning process valid?*
  - Do competences reflect our understanding of how they develop? Are competences developmental?
  - Do competences involve the whole person? Are competences holistic?
  - Do competences generalize across time and situations? Are competences generic?
  - Are assessment criteria valid?
  - Is assessor expert judgment reliable?
  - Do instruments measure the effects of instruction?

Friedman, M., Mentkowski, M., Earley, M., Loacker, G., & Diez, M. *Validating assessment techniques in an outcome-centered liberal arts curriculum: Valuing and communications generic instrument*. Final Report to the National Institute of Education, Research Report Number One. Milwaukee, WI: Alverno Productions, 1980.

Friedman, M., Mentkowski, M., Deutsch, B., Shovar, M. N., & Allen, Z. *Validating assessment techniques in an outcome-centered liberal arts curriculum: Social interaction generic instrument*. Final Report to the National Institute of Education, Research Report Number Two. Milwaukee, WI: Alverno Productions, 1982.

Mentkowski, M., O'Brien, K., Cleve, L., & Wutzdorff, A. *Assessing experiential learning: The learning incident as an assessment technique*. Milwaukee, WI: Alverno Productions, 1983.

- What evaluation, revision and validation techniques are more appropriate for nontraditional assessment techniques?

- Which generic assessments are better indicators of college performance and performance characteristics that can serve as cross-disciplinary outcome measures?

- How do students change on generic measures of student performance?

Alverno College Assessment Committee/Office of Research and Evaluation. Validating assessment techniques in an outcome-centered liberal arts curriculum: Insights from the evaluation and revision process. Final Report to the National Institute of Education, Research Report Number Three. Milwaukee, WI: Alverno Productions, 1980.

Alverno College Assessment Committee/Office of Research and Evaluation. Validating assessment techniques in an outcome-centered liberal arts curriculum: Integrated Competence Seminar. Final Report to the National Institute of Education, Research Report Number Four. Milwaukee, WI: Alverno Productions, 1982.

Alverno College Assessment Committee/Office of Research and Evaluation. Validating assessment techniques in an outcome-centered liberal arts curriculum: Six Performance Characteristics Rating. Final Report to the National Institute of Education, Research Report Number Five. Milwaukee, WI: Alverno Productions, 1983.

Alverno College Assessment Committee/Office of Research and Evaluation. Six Performance Characteristics Rating. Milwaukee, WI: Alverno Productions, 1978, Revised 1979.

Question II • How do students change on college outcomes described by their potential for cognitive development, learning styles and generic abilities?

- How do students change over time on measures of human potential--cognitive development, learning styles and generic abilities?

- Can change be attributed to performance in the learning process rather than to differences in age, background, or college program?

- What patterns of change emerge in the interrelationships of the human potential measures of cognitive development, learning styles and generic abilities, and generic measures of college performance?

Mentkowski, M., & Strait, M. *A longitudinal study of student change in cognitive development, learning styles, and generic abilities in an outcome-centered liberal arts curriculum*. Final Report to the National Institute of Education, Research Report Number Six. Milwaukee, WI: Alverno Productions, 1983.

Mentkowski, M., Moeser, M., & Strait, M. *Using the Perry scheme of intellectual and ethical development as a college outcomes measure: A process and criteria for judging student performance*. Vols. 1 & 2. Milwaukee, WI: Alverno Productions, 1983.

Mentkowski, M., Miller, N., Davies, E., Monroe, E., & Popovic, Z. *Using the Sentence Completion Test measuring Loevinger's stages of ego development as a college outcomes measure: Rating large numbers of protocols and maintaining validity of the ratings*. Milwaukee, WI: Alverno Productions, 1981.

Mentkowski, M. *Changes in student profiles on the Learning Style Inventory*. First Report to Participants in a Longitudinal Study of College Outcomes. Milwaukee, WI: Alverno Productions, 1981.

Mentkowski, M. *Understanding the development of thinking in college*. Second Report to Participants in a Longitudinal Study of College Outcomes. Milwaukee, WI: Alverno Productions, 1981.

Mentkowski, M. *Some questions and answers about evaluation studies*. Third Report to Participants in a Longitudinal Study of College Outcomes. Milwaukee, WI: Alverno Productions, 1979.

Mentkowski, M., & Fowler, D. *Learning to learn at work: Students, alumnae and other professionals*. Fourth Report to Participants in a Longitudinal Study of College Outcomes. Milwaukee, WI: Alverno Productions, 1981.

Question III • *Are outcomes mirrored in students' perceptions of their learning and abilities?*

- How do students understand and justify learning outcomes?

- How do students understand outcome-centered liberal learning as relevant to performance in personal and professional roles?

Much, N., & Mentkowski, M. Student perspectives on liberal learning at Alverno College: Justifying learning as relevant to performance in personal and professional roles. Final Report to the National Institute of Education, Research Report Number Seven. Milwaukee, WI: Alverno Productions, 1982.

Mentkowski, M. Alverno College Attitude Survey. Milwaukee, WI: Alverno Productions, 1977.

Mentkowski, M., & Much, N. Alverno College Student Perspectives Interview. Milwaukee, WI: Alverno Productions, 1980.

Mentkowski, M., & Bishop, J. Alverno College Student Careering Questionnaire. Milwaukee, WI: Alverno Productions, 1981.

Question IV

- How do outcomes learned in college relate to lifelong learning, abilities, careering and professional development after college?
    - How do expectations of students and realizations of alumnae compare?
    - What abilities and processes enable transfer of learning to professional performance and careering after college?
    - How are alumnae learning to learn at work, and do they describe lifelong learning?
    - What are alumnae perspectives on careering and professional development?

Mentkowski, M., Much, N., & Giencke-Holl, L. Careering after college: Perspectives on lifelong learning and career development. Final Report to the National Institute of Education, Research Report Number Eight. Milwaukee, WI: Alverno Productions, 1983.

Mentkowski, M., Much, N., & Giencke-Holl, L. Careering after college. Fifth Report to Participants in a Longitudinal Study of College Outcomes. Milwaukee, WI: Alverno Productions, 1984.

Mentkowski, M., & Much, N. Alverno College Alumna Perspectives Interview. Milwaukee, WI: Alverno Productions, 1980.

Mentkowski, M., & Bishop, J. Alverno College Alumna Careering Questionnaire. Milwaukee, WI: Alverno Productions, 1980.

- What perspectives and strategies do alumnae demonstrate in relating personal and professional roles?

Question V

- What competences describe the performance and perceptions of outstanding professionals?
  - What competences do outstanding professionals in nursing and management perform?
  - What competences do professionals in nursing and management perceive as relevant to performance, critical for education and selection, and descriptive of outstanding performers?
  - How do professionals describe their careering and professional development and what aspects are related to performance?

Mentkowski, M., DeBack, V., Bishop, J., Allen, Z., & Blanton, B. Developing a professional competence model for nursing education. Final Report to the National Institute of Education, Research Report Number Nine. Milwaukee, WI: Alverno Productions, 1980.

Mentkowski, M., O'Brien, K., McEachern, W., & Fowler, D. Developing a professional competence model for management education. Final Report to the National Institute of Education, Research Report Number Ten. Milwaukee, WI: Alverno Productions, 1982.

Mentkowski, M., O'Brien, K., McEachern, W., & Fowler, D. Developing a professional competence model for management education. Final Report Summary for Participants. Milwaukee, WI: Alverno Productions, 1983.

Bishop, J., Mentkowski, M., O'Brien, K., Birney, R., Davies, E., & McEachern, W. Management Performance Characteristics Inventory. Milwaukee, WI: Alverno Productions, 1980.

Mentkowski, M., & Bishop, J. Management Careering Questionnaire. Milwaukee, WI: Alverno Productions, 1980.

Alverno College Office of Research and Evaluation. Behavioral Event Inteview Writeup. Milwaukee, WI: Alverno Productions, 1980.

RESEARCH METHODOLOGY

Sample

The sample consisted of over 750 women students ages 17-55 at entrance and over 60 two-year alumnae ages 23 to 52 at Alverno College. Over 80 women nurses and over 100 women managers and executives ages 26-66 from the Milwaukee community comprised the sample for the professional studies.

Characteristics of the Validation Model

Correlational Rather Than Experimental Designs

Program development is multifaceted. Therefore, so is a validation design. We use multiple approaches, and demonstrate validity through establishing relatedness, rather than by establishing cause and effect relationships. Because the outcomes are developmental and the curriculum is changing, we must use correlational rather than experimental designs. If one cannot design laboratory studies that will establish cause and effect relationships then one must capitalize on correlational relationships, and that demands a model where the questions asked are in relationship to each other. The findings from one set of questions have implications for another.

For now, we have abandoned most experimental designs and methods for establshing validity. The emphasis is on comparison of changes in student performance over time against internal and external standards. We are not likely to use group comparison designs where one group consists of Alverno students, and another consists of students at a college which attracts students of similar demographics but does not have a performance-based curriculum. We have found that we cannot make accurate enough assumptions about where Alverno students and those from another college would be similar or different. Thus, the adequacy of such comparisons for providing accurate and useful results is highly questionable. And selecting a control college is impractical. We cannot really "prove" whether a constantly changing and evolving curriculum is effective or ineffective by using such experimental models. By comparing our students against external standards, however, we may have some indication of how our students compare to students at those colleges where similar instruments are used (e.g., Winter, McClelland & Stewart, 1981), and a range of student groups contribute to generalizable "norms." Clearly, all standards of this type arise partly from normative data.

In addition, all students complete at least four levels of the learning sequence. There are no intra-institutional control groups. Faculty who may not explicitly teach students a particular ability are aware of it and may still teach it implicitly. We have begun to internally compare students who complete four levels of an ability with those who go on to levels 5 and 6 as part of their major field, but the currently available criterion measures, for the most part, measure only small parts of the complex abilities demonstrated at level 6. Comparing alumnae who graduated prior to implementation of the performance-based curriculum with more recent alumnae is also unwise. The new curriculum had too many of its roots in the old; particularly in some academic departments. And the effects of the women's movement on careering outcomes could hardly be separated from effects of the new curriculum. A developmental framework cautions us that abilities learned in college may not be visible in the same form in later years. The predictive validity of an ability may be difficult to establish if we look for "more of the same" in a follow-up study of graduates, rather than evidence that an ability is developing and achieving integration with other abilities.

How Alverno students as a group compare normatively to students at other colleges receives less emphasis than how our students' individual gains over four years compare to (1) developmental norms, and other standards derived from the faculty's understanding of the abilities they teach toward, (2) students' perceptions of their own growth, and (3) standards drawn from external criterion instruments that most nearly approximate the measurement of the abilities that we teach toward.

But we have built several characteristics into the model that allow us to move beyond some limitations in correlational designs. First, we use an aggregate, triangulated model. Second, we use both longitudinal and cross-sectional designs that compare age and class cohorts. We use a time series design to attribute change to college performance, and match comparison groups for persistence in college. These characteristics of the validation model and longitudinal design are discussed below.

An Aggregate, Triangulated Model

As far as possible, we approach every outcome or factor we study from several directions. Creating models which ask questions simultaneously and focus on relatedness result in circularity of results and require that we use multiple sources of standards and study the development of multiple outcomes. We employ triangulation, which means that we measure the development of multiple outcomes and avail ourselves of multiple opportunities to compare student performance against multiple standards. As stated earlier, a changing curriculum does not allow for using experimental designs to research ascriptive questions. Thus, we rely on aggregate findings; if we are able to demonstrate results in an aggregate, or variety of ways, we will have more confidence that our observations are true and replicable.

One of the values of using aggregate findings and triangulation is that most questions related to the validity of programs are being asked somewhere in the model. While research takes time and effort, especially longitudinal research, some results with respect to a particular question are usually available. Since the research is carried out by in-house staff, they are aware of most sources of data and what is currently known regarding a particular issue.

Here is an example of approaching an outcome from several directions. Consider the complexity of the process faculty have in mind when they use a phrase like "analytic thinking." Clearly, no single measure--whether devised by a faculty member for instruction and assessment or by a team of psychometricians for research--can hope to capture the whole of such an activity.

So we aggregate several measures of different kinds, each of which bears upon some portion of the domain "analytic thinking," and takes several approaches at once. We can thus develop a general sense of whether something in that domain is changing, and can begin to ask questions about what it might be and why it is changing based on the differential responses the varied measures yield.

Using triangulation helps solve other design problems. As stated earlier, experimental designs utilizing control groups are inappropriate in a changing curriculum. All students experience the "treatment" and even past alumnae, students from other colleges or persons not in college do not meet the criteria for serving as controls. In this manner we may pool successive results on in-class performance assessments from several different disciplines, results from several widely available measures of cognitive development and/or analytic reasoning (human potential measures), and results on student perceptions from the sequence of open-ended interviews. With this approach, we avail ourselves of at least three independent sources that are researching similar, general questions. We can add to our understanding of more specific questions, while recognizing that results must be confirmed from other independent sources. We see, from several angles, phenomena we know are difficult to research given the practical limitations imposed by real-life rather than laboratory settings. Using three groups, students, alumnae, and other professionals, allows another set of comparisons at a different level of analysis.

Validation Model Components

Figure 3 presents components of the validation model. It diagrams the three major approaches to validating outcomes in relation to each other (performance, potential, perceptions) to illustrate relatedness and triangulation. The model also utilizes students, alumnae, and other professionals (see page 92).

The sources of data have been identified and placed in relationship to each other in the model (Figure 3) in order to better describe the opportunities for relatedness and triangulation. It is apparent that if questions are studied simultaneously, there are many opportunities for the outcomes defined to be further described and elaborated, and the results compared, as the studies continue (see page 95 and following).

Establishing relationships between changes in outcomes during college and future outcomes, is a complex task. It seems clear to us that the measurement of such complex outcomes, and the measurement of change will proceed with many difficulties. There is no simple one-on-one match between any of the outcomes, nor between outcomes and future outcomes. Clearly, the several approaches attempted simultaneously in Figure 3, while reflecting the complexity of questions asked, also demand a sophistication of strategies and instruments that we have not yet achieved in higher education.

Since our purpose is to develop a validation model that is a process, we can proceed with our work in spite of the pressure that comes from researching evaluative questions, to demonstrate the "worthwhileness" of the program and to show gains in performance. Indeed, given the state of the art in measuring the complex outcomes of college, we can make progress in some cases by describing those outcomes initially, and later asking questions of evaluation.

Such a complex model can seem overwhelming. But we have found it helpful to specify our questions and some ways in which we can begin to ask them. Asking the questions, rather than putting them off until adequate designs, strategies or instruments are available, seems to us a better way to grapple with their complexities. The model is an opportunity not to generate perfect "results," but to enable us to ask better questions.

From the research questions, we have determined the basic structure of a model for validating the curriculum and changes in student performance. It is clear that our task is to identify and measure changes in student potential. We must obtain a

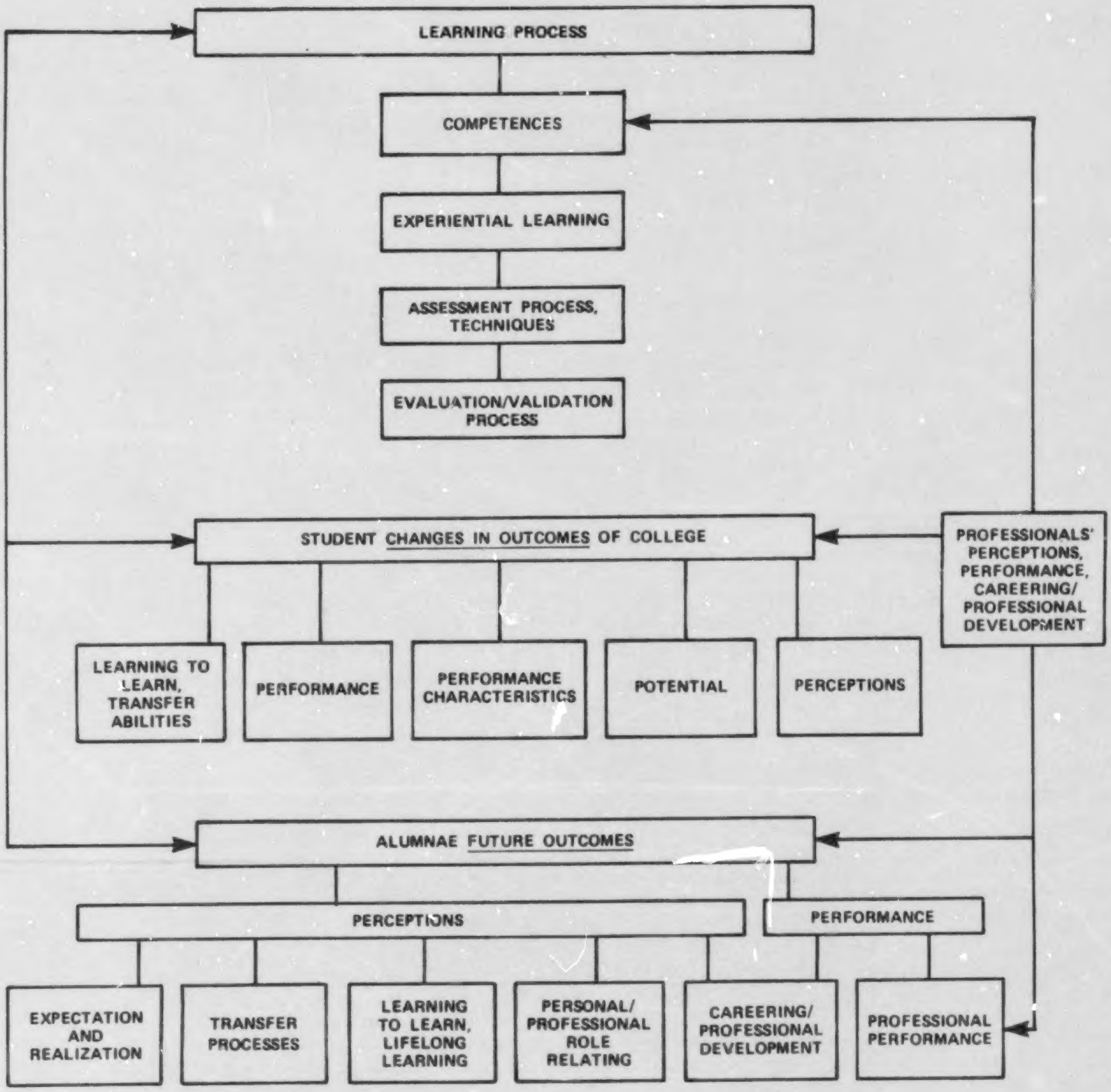

LEARNING PROCESS
COMPETENCES
EXPERIENTIAL LEARNING
ASSESSMENT PROCESS, TECHNIQUES
EVALUATION/VALIDATION PROCESS
STUDENT CHANGES IN OUTCOMES OF COLLEGE
PROFESSIONALS' PERCEPTIONS, PERFORMANCE, CAREERING/ PROFESSIONAL DEVELOPMENT
LEARNING TO LEARN, TRANSFER ABILITIES
PERFORMANCE
PERFORMANCE CHARACTERISTICS
POTENTIAL
PERCEPTIONS
ALUMNAE FUTURE OUTCOMES
PERCEPTIONS
PERFORMANCE
EXPECTATION AND REALIZATION
TRANSFER PROCESSES
LEARNING TO LEARN, LIFELONG LEARNING
PERSONAL/ PROFESSIONAL ROLE RELATING
CAREERING/ PROFESSIONAL DEVELOPMENT
PROFESSIONAL PERFORMANCE

Figure 3. Components of a validation model for the Alverno learning process.

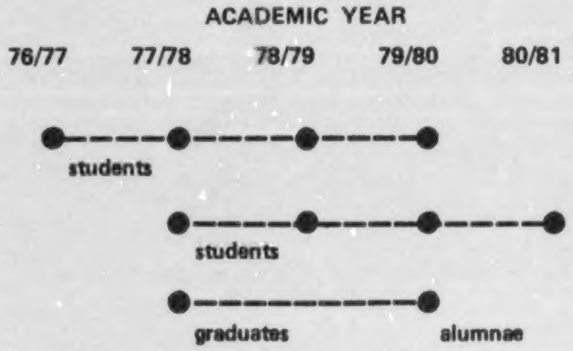
description of changes in student potential over time in relation to student achievement of competence in the learning process, to establish the relationship between student potential and performance in the learning process. In addition, we must identify and measure future outcomes of graduates, and identify relationships between student and alumna outcomes. We must also identify and assess student perceptions, since student perceptions are external standards against which performance and potential can be compared. We must also identify and assess the performance and perceptions of alumnae and other professionals.

Characteristics of Research Designs

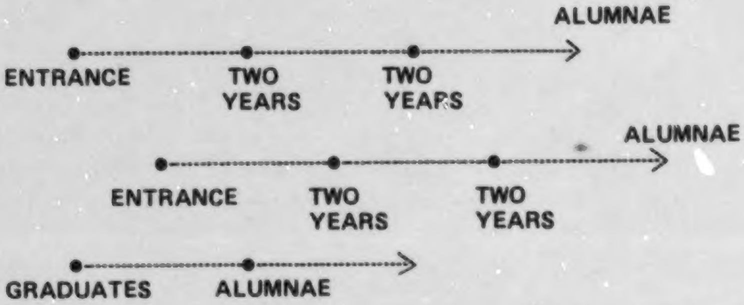
Longitudinal and Cross-Sectional Approaches

Rather than equate change with average gains, faculty are interested in the extent to which each student changes. The curriculum may facilitate growth only for students who are verbally skilled. Or students who enter college with already sophisticated abilities may coast through a portion of curriculum and make few, if any, gains. For facilitating individual patterns of change and growth, faculty designed the curriculum to include consecutive assessments throughout a student's college career. Consequently, we are likely to select similar longitudinal designs. While longitudinal studies using external criterion measures are time-consuming and costly, they yield individual growth patterns. The following diagrams provides a picture of the combined longitudinal and cross-sectional designs used in our study of student and alumnae outcomes. Each dotted line represents one of three student groups assessed repeatedly in a time series. Each dot on the line represents an assessment.

PERCEPTIONS: LONGITUDINAL PERSPECTIVES INTERVIEW DESIGN



HUMAN POTENTIAL MEASURES: LONGITUDINAL DESIGN



Total Sampling

Students drop out of college and new ones enter in midstream. To enable longitudinal research with adequate sample sizes, we use total sampling involving all students entering or graduating in a particular year, rather than random sampling.

Age and Age Cohort

Prominent in our report is our concern with age and age cohort differences. Because our student population ranges in age from 17 to 55 years, and because we expect to continue to attract older students in the future, we have a special opportunity to examine change across a larger range of adult life. We have used age, broken down into traditional and older student cohorts, to compare the general influence of life experience, or "maturation," to formal education experience. We have also used age, standing again for life experience in general, as the logical first cause of differences in development and other abilities when examining the causes of change.

Class Cohort

For the purposes of general program validation, we undertook the extra effort of studying two successive years of class cohorts to minimize the possibility of unseen cohort effects in our general conclusions about change (Nesselroade & Baltes, 1979). The cohort variable is not interesting in itself, but it proxies for whatever events on a social level were influential in student selection of a year to enter college. The age range of our population and the volatile environment of the seventies and eighties in the changing roles of women, make this issue particularly important for our women students, many of whom are first generation college students.

Time Series Design

It is part of our language to speak of "the four years of college" as if all the students who enter in a given year (or at least all the persisters) complete the program and graduate four years later. But this has never been the case. Indeed, with the influx of "new" students and their multiple life commitments, the four year model is already for many institutions a minority pattern rather than a norm.

This is an important advantage for both our longitudinal and cross-sectional studies. We administer our external measures at entrance, two years later, and again a year and a half later, rather than when a student is a freshman, beginning junior or graduating senior. Thus, the time at which students are assessed on external measures is held constant, while the number of semesters they take to make that progress can vary.

Because Alverno students are credentialed for successful demonstration of their abilities, at successive levels of sophistication, we use three measures of progress. One is the accumulation of her demonstrated ability levels on her performance assessments; another is the number of credits completed and the third is the record of semester hours completed. The first two measures vary because the number of ability assessments offered by an instructor, as well as the number attempted and completed by each student, is different in every course. This time-variant approach allows us to use the variation among students in the time they spend in college, and their quantitative and qualitative progress through the program as a basis for comparison. We can then explore such key questions as whether students who perform more successfully in this program also show more change on measures from outside the college.

Thus, in our longitudinal design, we assess students at consistent time intervals (see Table 1). Performance in the curriculum varies, so we can investigate changes as a function of performance in the curriculum. Many studies of college effects, whether cross-sectional or longitudinal, have assessed students when they are Freshmen and when they are Seniors. In contrast, we have assessed an entire entering class as they began their studies, and then have reassessed the same group two years later, and for a third time, about two years later. Most entering students will be new Freshmen, but many will have prior college credits and, in class terms, will be Sophomores or Juniors at

Table 1.

Design for the Administration of Human Potential Measures and Student Perception Measures for Longitudinal and Cross-Sectional Studies of Student Outcomes

	Entrance Cohort	Academic Year 1976/77	1977/78	1978/79	1979/80	1980/81	
Longitudinal	1976 Weekday College	HPM SPI AS	SPI AS	HPM SPI AS	HPM SPI AS CQ		Careering Follow-up →
				ICS SPC	SPC		
	1977 Weekday College		HPM SPI AS	SPI AS	HPM SPI AS	HPM SPI AS CQ	Careering Follow-up →
					ICS SPC	SPC	
	1977 Weekend College		HPM SPI AS	SPI	HPM SPI AS	HPM SPI AS CQ	
Cross-Sectional	1972/73 Weekday College (Pilot)	HPM/HPM SPI/SPI					
	1973/74 Weekday College		HPM/HPM SPI/SPI		Careering Follow-up → SPI CQ		

Note. See Figure 4 for overview of components of the program validation model with measures. Student Perspectives Interview (SPI) data were collected on a subsample of students participating in the administration of the Human Potential Measures (HPM), but all completed the Attitude Survey (AS) and Careering Questionnaire (CQ). All Weekday College students completed the Integrated Competence Seminar (ICS) and were rated by faculty on the Six Performance Characteristics (SPC).

entrance assessment. A typical student who entered as a new Freshman and attended regularly for two years might in fact be a first semester Junior at second assessment, but another student might have entered Alverno as a Sophomore by standing, taken only two courses in the entering semester, not registered again until second assessment, and still be a Sophomore. Class standing may be different at the third assessment two years later as well. It is precisely the variability in attendance and performance over a specified period of time that we use to investigate claims of change effects for the learning process as a global entity. When appropriate, we do take advantage of the fact that our design approximates the beginning, middle, and end of a typical student's college career, or that the assessment intervals approximate the periods of general education and pre-professional education for the typical student.

Achievement Cohort

In a performance-based curriculum, students must demonstrate successive mastery of the competence levels. Their record of performance in the curriculum is an indicator of level of achievement in the curriculum at any point in time. Students vary in the number of competence units they have achieved, and can thus be categorized as high versus low achievement. The effects of performance in the curriculum can be studied in this comparison.

Matching Comparison Groups for Degree Completion

A well known problem with comparing groups of entering and graduating students in cross-sectional studies is that entering classes include many students who will not persist through college, while a graduating group consists of persisters by definition. Many studies try to control for this difference by matching students on some variable believed to predict persistence, most often an academic achievement variable.

We were able to control directly for persistence in the cross-sectional study by using one of the entrance cohorts of the longitudinal study who were in college four years later, as our entering student comparison group. Thus, our cross-sectional comparison provides a conservative estimate of change.

Controlling for Other Factors That Contribute to Change in Performance

To relate change to performance in the learning process, a series of analyses were first conducted to control for other factors that contribute to change in performance before testing for performance effects. First, age and other background variables (religion, parent's education and occupation, high school grades, prior college experience, and marital status) were tested for correlation with entrance assessments. Those variables that accounted for differences in entrance assessments were then further examined for relationship to change in performance between assessments. If any background variable accounted for change between assessments, then that difference was controlled in testing effects of performance. Similarly, effects of program differences incidental to the learning process (entrance cohort, residence, part time or full time status, and major) were tested after background variables but before testing for performance effects. Program variables accounting for change over that accounted for by background variables were also controlled before testing the relationship of change to performance. Thus, any relationship between performance and change was only considered an effect of performance once the other possible sources of variance were controlled.

Increasing Rate of Participation

Readers experienced in longitudinal data collection will be interested in the extensive and detailed description we provide of our data collection procedures (Mentkowski & Strait, 1983). We employed a range of effective strategies to get and keep the cooperation and participation of all students entering during the two-year entrance phase of the project. The continuous effort to motivate students to participate may be seen as reducing generalizability to populations not so motivated. We have taken the position that complete data is a more important goal. We have motivated students to participate in order to achieve the highest possible rates of participation, and to stimulate the highest level of performance.

In addition, we employed a variety of strategies to ensure the participation of professionals, particularly for those in management. These procedures are described in detail in Mentkowski, O'Brien, McEachern and Fowler (1983).

Procedures

Procedures for carrying out the research objectives were designed to meet four broad objectives.

- Create a context for validation research

- Respond to concerns of students, faculty, and professionals

- Collaborate with colleagues in research and curriculum development

- Respect the values and objectives of the program and the research participants

To carry out these objectives, we devised two strategies. One was to establish evaluation as a concept and function at Alverno College (Figure 2). The second was to develop more specific research methods that mirrored the values, objectives, and assessment process and techniques of the college, as well as the more recent frameworks and instrumentation in fields related to the study of college outcomes.

Create a Context for Validation Research

We created a context for validation research primarily by establishing evaluation as a concept and function in the curriculum. As stated earlier, our colleagues in higher education were often interested in beginning evaluation/validation efforts of their own. For this reason, we document the context for evaluation that we established at Alverno, as a case study that occurred at one institution. For us, this meant identifying evaluation goals for an Office of Research and Evaluation that could coordinate the functions necessary to carry out the research methodology and dissemination of the results. Consequently, this Office was created with the following overall goals.

- Establish research and evaluation as a concept and function

- Evaluate the quality, effectiveness and validity of the learning process

- Contribute to creating a more generalizable model of adult development and learning

- Contribute to program development and student development

- Assist in insuring the quality of various research and evaluation activities within the college

- Establish Alverno as an accountable educational institution in the community and as a contributor to higher education research and evaluation

The Office of Research and Evaluation was established in 1976 at the beginning of our efforts to validate the curriculum, and is now a fully institutionalized and funded part of the college. The Office of Research and Evaluation was created as a service to the college. The evaluation/validation process is a curriculum component (Figure 2) that enables faculty to step back from the program objectively and systematically, and take a hard look at program functioning and validity in terms of student and alumnae outcomes.

Respond to Concerns of Students, Faculty and Professionals

If research is to yield results with the broadest possible implications, not only for the college, but also for the immediate community it serves, research personnel must consider themselves in service to the broader goals of their students and faculty colleagues.

Faculty Involvement

The involvement of faculty is critical to the identification of the research questions, the carrying out of the studies and the critique and implementation of the results. Faculty were well aware of the concerns of higher education for validating outcomes, and the kinds of specific issues and questions that were central to curriculum reform.

Several faculty groups were essential to the validation of competences and assessment techniques. The Assessment Committee, consisting of members of the faculty who are specialists in assessment design, played a major role in designing and carrying out validation of assessment techniques. The Committee worked with the Office of Research and Evaluation to validate two interdisciplinary measures of college performance, and to create an instrument evaluation and revision process (Alverno College Assessment Committee/Office of Research and Evaluation, 1980, 1982, 1983). The Assessment Center provided structure for administering and scoring of the Integrated Competence Seminar using external assessors from the business and professional community. The Assessment Committee created definitions of the Six Performance Characteristics and in collaboration with the Office of Research and Evaluation, conducted the faculty rating of students on a measure (Six Performance Characteristics Rating) designed in the Office of Research and Evaluation to provide an external cross-disciplinary measure of college performance of the broad outcomes of college. The competence divisions, most notably Communications, Valuing and Social Interaction worked as research teams to validate generic instruments (Friedman, Mentkowski, Deutsch, Shovar & Allen, 1982; Friedman, Mentkowski, Earley, Loacker & Diez, 1980).

The Discipline Divisions, Chairpersons, Department Coordinators and all faculty members were involved in planning and carrying out strategies for involving students, for supporting the validation efforts, for communicating a rationale for the studies to individual students or classes, for identifying ways to approach and involve students in followup efforts to enhance the number of students participating, and for providing opportunities for Office of Research and Evaluation presentations. These presentations to students were designed to motivate students to participate, to give students feedback on their performance on one of the measures assessing human potential, or to give students feedback on the overall evaluation/validation results. The Dean's Office and the Assessment Center collaborated to plan the administration of the human potential measures so that involvement and participation occurred as part of regular assessment procedures.

Further, the Department of Business and Management and the Division of Nursing collaborated with the Office of Research and Evaluation to carry out the studies of professional perceptions and performance in nursing and management, and used their credibility and networking in the community to establish contacts with individuals and organizations. Several offices in the college, having direct access to the business and professional community, contributed information and contacts for the studies of professional competence: the Office of Career Development, the Office of Off-Campus Experiential Learning, the Development Office, and the President's Office.

Student Involvement

We were also responsive to students' concerns and ideas. We surveyed attitudes from half the student body in the spring of 1977, and conducted in-depth interviews of the first ten graduates in 1976 (Mentkowski, 1977b). This information was particularly helpful in focusing some of the research questions in our study of student perceptions. Issues identified for students included a focus on the relevance of education to careering after college, the importance of improving the curriculum for all students, concerns with the validity of a newly formed program, interest in performing well after college, and so on. Student participants in the research often asked questions that helped us to clarify and focus the questions we were raising. These students also identified central concerns they had about participating so that adjustments could be made in data collection strategies.

Involvement of Professionals

Members of the business and professional community were already involved in the definition of competence (Advisory

Councils), the creation and carrying out of experiential learning (through internships mentored by professionals in the field), and in the assessment process (through assessment designers in business, and external assessors of student performance drawn from the business and professional community). Evaluation/validation efforts relied on such external input.

Collaborate with Colleagues in Research and Curriculum Development

At the start of the NIE grant period, we were already collaborating with colleagues in higher education research and curriculum development. Alverno College had just completed a broad dissemination of the learning process through grants from the Kellogg Foundation and the Fund for the Improvement of Post Secondary Education, and many colleagues from other institutions had visited the campus over a period of years. We also maintained continuing relationships with instrument designers (see "Instruments") and centers that were working toward issues similar to those in which we were involved, such as the Center for Moral Education at Harvard University, McBer and Company of Boston, the Center for the Application of Developmental Instruction at the University of Maryland, and Loevinger's research team at Washington University in St. Louis.

Early on, as a member of a consortium coordinated by McBer and Company and funded by FIPSE, we helped test new measures of college outcomes. We worked with members of American College Testing and the Educational Testing Service, who were interested in developing innovative measures of college outcomes. At the same time, we were drawn to members of the research community who were experimenting with new measures of competence and strategies for assessing competence, as well as theorists in cognitive development and their colleagues who were measuring patterns in human cognitive growth. We identified an Evaluation Advisory Council made up of experts from other institutions who could provide more specific technical assistance. Our Evaluation Advisory Council (Donald Grant, University of Georgia; Milton Hakel, Ohio State University; Joel Moses, AT&T) assisted us in many issues related to design, instrumentation and validation during several visits to the campus.

A major contribution was made through extensive discussions on the issues conducted by Jean Miller of the National Institute of Education. These discussion meetings involved directors of five other projects. These sources, together with experts from our own faculty, formulated the more specific questions. Alverno faculty were part of the research teams. This was important because they would be primarily involved in tryout, implementation and dissemination of results. The overall process of ensuring responsiveness to the work by students and faculty contributed directly to the quality of the work. Thus, the methodology was constantly under critique and review.

Respect the Values and Goals of the Program

Use Existing Program Evaluation Structures

Since evaluation/validation is a program component (Figure 2), it necessarily follows that the methodology it carries out needs to be consistent with the objectives and methods of the other program components. Values underlying methodology need to be consistent as well. For us, several informal, nonsystematic processes for program revision and evaluation were already built into the program at the time the validation research was begun. For example, faculty understand very well what student perceptions and attitudes toward the curriculum are. In a 1977 study of student attitudes where half the student body completed a survey (Mentkowski, 1977a), all faculty individually completed the survey the way they thought students would. Faculty accurately predicted modal student attitudes toward the program, toward faculty, and toward educational and administrative services (Mentkowski, 1977b). In this case, we tested the informal network for evaluating student attitudes in a more systematic way and demonstrated its effectiveness. This informal evaluative network is critical to planning strategies for involving student participants in validation research.

We relied on systematic, in-place evaluation and revision processes to carry out the research objectives. An example of these processes is the one established to ensure design-based validity of the program. It includes regular review, evaluation and revision of assessment techniques established by the Assessment Committee for the faculty. These reviews figured heavily in the design of strategies for validating assessment techniques. Competence and Discipline Divisions also play a role in program evaluation and members of these groups served on the research teams for several of the studies.

Provide Feedback for Program Improvement

In an educational environment, validation is more a manner of making incremental and qualitative judgments than of making static and quantitative ones. It is interesting, after all, to know that students during a five year period demonstrated certain patterns of development and that these seem attributable to certain elements in the experience of "the college." But by the time we can make that statement, it is old news.

What everyone really wants to know is whether today's or tomorrow's version of "the college" is likely to have similar impacts on today's or tomorrow's students. Validation studies, properly designed, can help. They can enable us to make incremental judgments about whether and how the college is maintaining and improving its effectiveness in delivering desirable outcomes, as it evolves to meet the needs of subsequent cohorts and moves into new program areas.

Nor does validation simply stand aside and judge the college's evolution; it contributes directly to the faculty's attempts to improve programs. The traditional concept of objective detachment is impossible from the outset, since the faculty's active collaboration is needed in defining and redefining outcomes, as well as in devising at least some of the means (and arranging most of the opportunities) for measuring student attainment of them.

Attempting later in the process to "protect" the program or study participants from the impact of validation results would clearly be unethical, since qualitative feedback toward improved performance is the prime motive for both faculty and student participation. It would also be self-defeating. Closing off dialogue with the practitioners would immediately undermine the study's own validity, since it would cut off the primary source for making adaptive changes in validation methods and strategies. It would also lead, in practical terms, to disaffection and rapid termination.

Instead of mutual detachment, the operating mode in validating a dynamic educational program is mutual collaboration. Joining with the validation team to interpret even early results, faculty then apply what they have learned and attempt to improve their program. The past becomes, in effect, the control and the present is an experiment in incremental change. If program modifications in turn yield improved outcomes, then the validation effort is itself validated along with the faculty's efforts. In a constant dialogue characterized by ongoing feedback and collaboration, practitioner and validator thus help each other to sharpen their focus, deepen their understanding, and improve their effectiveness. At certain points, our methods and results can be set forth for review by our Advisory Councils made up of experts in validation who serve as other, more external sources of critique and input.

Respect the Values and Goals of Research Participants

Contacting Participants

A central concern in involving all participants in the study was to ensure that contacts with participants and organizations met standards for involvement, including informed consent, confidentiality and feedback on the results of the studies as they became available. We were conducting longitudinal research with students and alumnae. Ineffective procedures could doom the project from the start. Further, some of the research was designed to build a bridge between the college and alumnae, and between the college and the professional community it serves. Our contact procedures, by communicating our efforts, could be expected to positively contribute to the reputation of the college and the degrees it offers.

We consulted various members of the faculty and students in identifying strategies for contacting students. We also involved members of the college, Board of Trustees, Advisory Councils, and members of the business and professional community to identify the most appropriate ways to contact professionals in nursing and management. We intended that procedures would respect professionals' right to informed consent and that would respect the protocol, administrative structures and values of the institutions and organizations who employed them.

Communicating Rationale and Confidentiality

In consulting with faculty and students, we identified the best ways to inform students who were research participants (Mentkowski & Strait, 1983). Prior to each assessment in the longitudinal and cross-sectional studies, we made presentations on a regular basis to the faculty, informing them of upcoming student involvement, ways it would impact their class schedules, and the rationale for the studies so that they would be able to respond to student questions about the nature of their involvement. We consistently made presentations to the students in classes about the rationale for their participation. Students were contacted individually if group presentations were not workable. In order to maintain student confidentiality of participation in the interviews of student perceptions which involved a subsample of students, all contacting was completed by private letter or by research staff who maintained confidentiality. When whole classes of students were involved--and who was involved was public knowledge--faculty were consulted about our procedures and their affect on individual students, who for personal reasons, were not participating. Great care was taken to involve student participants in the rationale for the study. On rare occasions when a student refused participation, such refusal was of course respected. Confidentiality of individual performance was maintained throughout the studies through a system of code numbers to which only research staff had access.

Student input in developing procedures for contacting and involving students in the work was particularly helpful (see: "Questions and Answers about Evaluation Studies: Third Report to Participants in a Longitudinal Study of College Outcomes," Mentkowski, 1979). Students critiqued study procedures and offered alternative suggestions that would assist in developing more effective strategies.

We also took care in the involvement, informed consent and confidentiality of professional participants. Organizations and their executives were contacted initially with attention to rationale and informed consent. Participants were contacted by executives or administrators, and by the researchers with a rationale asking for participant consent. Confidentiality was promised and carried out (Mentkowski, DeBack, Bishop, Allen & Blanton, 1980; Mentkowski, O'Brien, McEachern & Fowler, 1982).

Feedback on Study Results

We made efforts to provide feedback on the results as they became available. Students involved in the studies received both individual and group feedback on the results, in oral presentations and written reports (Mentkowski, 1981a, 1981b; Mentkowski & Fowler, 1981). Throughout the four years of her participation, and as an alumna in the followup studies, each student participating in the longitudinal studies received consecutive, individual feedback and interpretation of her score, and group results on one of the measures she completed (Mentkowski, 1981a). The Chairperson of the Division of Nursing made a series of presentations to professional groups on the results of the study of the performance and perceptions of nurses, and copies of the report were distributed to the institutions involved. Copies were also distributed to attendees at dissemination sessions. A final report summary was mailed to each organization executive and manager participating in the study of management professional perceptions and performance (Mentkowski, O'Brien, McEachern & Fowler, 1983).

Rate of Participation Achieved

We found our efforts to involve faculty, students and professionals and their organizations to be very successful. While such attention to creating procedures involved a large amount of staff time during the data collection which occurred over a five year period from 1976 to 1981, and added to the time and costs of the research effort, such effort was rewarded in high participation rates. First, student participation rates ranged from 83 to 99 percent across the three separate longitudinal assessments over a five year period (Mentkowski & Strait, 1983). Participation rates for the student perceptions study (Much & Mentkowski, 1982) were overall, 99 percent.

Eighty-nine percent of the alumnae contacted two years after college participated (Mentkowski, Much & Giencke-Holl, 1983). All three institutions involved in the study of nursing performance participated when contacted, as did 100 percent of the nurses invited to be interviewed (Mentkowski, DeBack, Bishop, Allen & Blanton, 1980). Fifty-three of the 55 organizations contacted for the management study agreed to participate as did 94 percent of the managers and executives contacted (Mentkowski, O'Brien, McEachern & Fowler, 1982).

The research described in this report was conducted over a period of five years. The fact that we could continue our work with students in the community of a small college and in the larger professional community over a long period of time and initiate and maintain participation is support for the effectiveness and ethics of our procedures.

Choosing, Creating, Validating and Scoring Instruments

Characteristics of Instruments

In the section "Defining and Assessing Outcomes at Alverno College," we discussed the importance of selecting frameworks and measures for validating outcomes that match, as nearly as possible, the goals and assessment theory of the Alverno faculty. Instruments that we chose or created for each of the several research objectives were derived from curricular objectives, principles of assessment, and characteristics of assessment techniques that have been identified by the faculty. For us, the faculty's definition of competence as developmental, holistic and generic, and the principles of assessment (Alverno College Faculty, 1979) are a cornerstone in choosing and creating instruments.

Our validation instruments must reflect the general characteristics of the faculty's techniques for assessing student performance if we are to adequately validate student outcomes. We must resist the temptation to import ready-made instruments currently available to assess outcomes and simply adopt them as validation tools.

A program evaluation instrument, like an assessment instrument, should have the following characteristics.

- It measures the learning objectives for a competence level or the broad ability being studied
- It elicits the full nature of the ability--a holistic process

- It allows an opportunity to integrate content at an appropriate level of sophistication
- It allows measurement of the integration of a competence with other relevant abilities
- It is designed as a production task rather than a recognition task
- Its mode is similar to the ability as usually expressed, rather than an artificial mode
- It will most likely be subjectively scored, by more than one assessor, against objective criteria
- It can be administered externally to the learning situation--for example, in the Assessment Center
- It is diagnostic, because the student expects structured feedback as an intrinsic part of every experience in which the college asks her to demonstrate her abilities
- It provides evidence for credentialing the student's performance (Mentkowski, 1980)

While performance-based curricula are likely to employ criterion-referenced measurement techniques, Alverno's student-centered curriculum also creates measures that elicit a range of individual differences to provide adequate information on the unique way each student demonstrates her abilities. Such information is particularly useful for diagnostic student feedback. Thus, instruments may also be designed to measure a range of student performance in meeting criteria as well as to provide evidence that the student was or was not credentialed.

While production type tasks usually generate qualitative results, we rely on generating both qualitative and quantitative data for responding to the range of research questions. The instruments we selected or created for measurement of each component of the validation model are indicated in Figure 4.

Types of Measures

Recognition and Production Measures

Two forms of organization were explicitly built into the selection of instruments: the production versus recognition characteristic and the developmental continuum characteristic. Both characteristics stem from Alverno assessment theory.

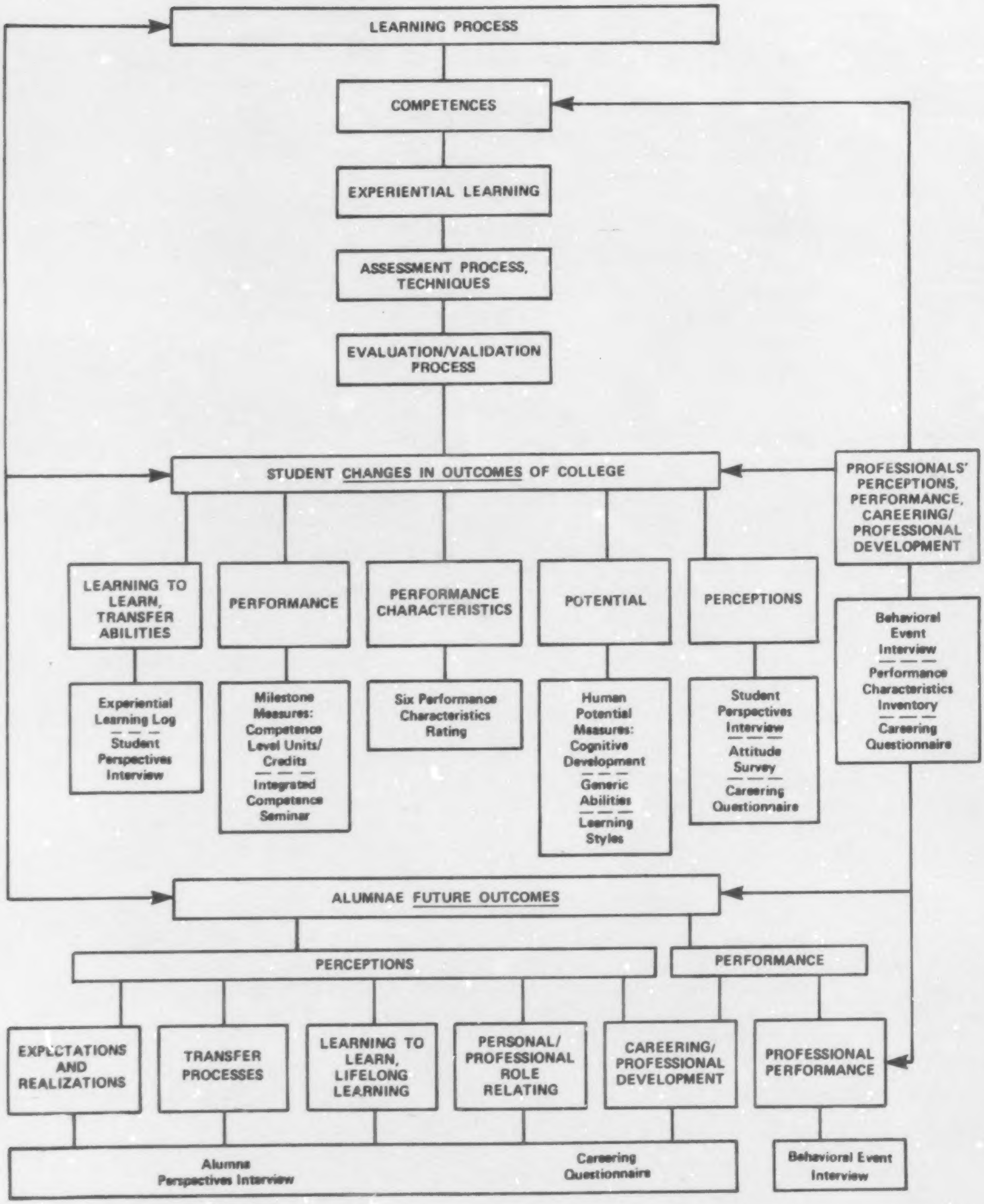

LEARNING PROCESS
COMPETENCES
EXPERIENTIAL LEARNING
ASSESSMENT PROCESS, TECHNIQUES
EVALUATION/VALIDATION PROCESS
STUDENT CHANGES IN OUTCOMES OF COLLEGE
PROFESSIONALS' PERCEPTIONS, PERFORMANCE, CAREERING/ PROFESSIONAL DEVELOPMENT
LEARNING TO LEARN, TRANSFER ABILITIES
PERFORMANCE
PERFORMANCE CHARACTERISTICS
POTENTIAL
PERCEPTIONS
Behavioral Event Interview
Performance Characteristics Inventory
Careering Questionnaire
Experiential Learning Log
Student Perspectives Interview
Milestone Measures: Competence Level Units/ Credits
Integrated Competence Seminar
Six Performance Characteristics Rating
Human Potential Measures: Cognitive Development
Generic Abilities
Learning Styles
Student Perspectives Interview
Attitude Survey
Careering Questionnaire
ALUMNAE FUTURE OUTCOMES
PERCEPTIONS
PERFORMANCE
EXPECTATIONS AND REALIZATIONS
TRANSFER PROCESSES
LEARNING TO LEARN, LIFELONG LEARNING
PERSONAL/ PROFESSIONAL ROLE RELATING
CAREERING/ PROFESSIONAL DEVELOPMENT
PROFESSIONAL PERFORMANCE
Alumna Perspectives Interview
Careering Questionnaire
Behavioral Event Interview

Figure 4. Components of a validation model for the Alverno learning process with external validation instruments.

The task characteristic of production versus recognition has been given a thorough treatment by McClelland (1980) though he refers to them as "operant" versus "respondent" measures. The basic issue is that, across many kinds of research questions, instrument tasks that in some way ask the participant to respond in the terms of the test developer rather than create or produce a response, have been poor predictors of future behavior of the person. Recognition measures test the investigators' reality, but not necessarily the reality of the participant, and it is usually the participant we want to know something about. While this perspective puts a higher value on operation or production measures, a more neutral view would still hold that the two types of measures assess different things, so there is more to learn by using both types of measures. We have intentionally used both production and recognition measures.

Because our criteria for instruments demand proactivity and a self-generated response on the part of the student, we have chosen the interview as the most unstructured production task. Interviews that measure student perceptions need to be derived from a student's thinking, and we have designed our own interviews for use with Alverno students and alumnae. Interviews with professionals have followed a standard critical-incident technique (McClelland, 1978) that is part of Job Competence Assessment (Klemp, 1978), as has our instrumentation measuring learning to learn (Experiential Learning Log) (Mentkowski, O'Brien, Cleve & Wutzdorff, 1983).

Developmental Measures

Some of our measures were designed by developmental psychologists to explore developmental phenomena, but others were designed for other purposes. Our beginning assumption is that performance on every measure has a developmental component, but that there are aspects of the task which are affected by non-developmental experiences and abilities.

External Criterion Measures

A major task in this research was to select a battery of external criterion measures (Human Potential Measures). Measures of college outcomes have come under fire as measuring knowledge without performance, and as unrelated to future performance after college (McClelland, 1973). In fact, we have not been able to identify any one external criterion measure that provides a perfect match to any of the abilities we are validating. Given our criteria for instrument characteristics, particularly that they should be production tasks in order to measure the learner in action, few measures meet either the demands for the holistic nature of the ability or the mode of measurement. We have found that internal validation is best carried out with faculty designed generic measures: generic instruments measuring Valuing and Communications (Friedman, Mentkowski, Earley, Loacker & Diez, 1980), Social Interaction (Friedman, Mentkowski, Deutsch, Shovar & Allen, 1982), the Integrated Competence Seminar (Alverno College Assessment Committee/Office of Research and Evaluation, 1982), and the Six Performance Characteristics Rating (Alverno College Assessment Committee/Office of Research and Evaluation, 1983).

External validation is most effective with measures of broad outcomes (cognitive development, learning styles and generic abilities). As external criterion measures, we selected instruments that assess broad outcomes. Some cognitive-developmental measures, and recently developed measures of generic abilities and learning styles (e.g., the Cognitive Competence Assessment Battery developed by McBer and Company), have more nearly met our criteria for instruments, and allow us to "talk to" researchers and theorists outside the college through the common language of test scores and quantitative results.

One advantage of using criterion measures that have achieved some reputation is that other colleges are also participating to some extent in collecting data on students. As members of a consortium of colleges, we cooperated with McBer and Company who have administered many of the instruments used in this study to students at a range of colleges and universities with both highly selective and more open admission practices (Winter, McClelland & Stewart, 1981). James Rest (1979a, 1979b) maintains a clearinghouse on Defining Issues Test data and Jane Loevinger has published college student norms on the Sentence Completion Test, which are useful in comparing changes of Alverno students with those at other colleges. Other norms for the Perry scheme (Mines, 1982) and Kohlberg's stages are also available (Kohlberg, 1981b).

In addition to the instruments that employ production type tasks, we use a variety of ratings and questionnaires. The Six Performance Characteristics Rating, the Attitude Survey, the Management Performance Characteristics Inventory, and the Student and Alumna Careering Questionnaires are examples of these types of measures. Student registration and assessment records provide a range of information on student progress through the curriculum and performance on generic assessments.

Create and Validate Instruments

We had heavy involvement in creating and validating some of the instruments we used. Except for those instruments created for the nursing and management studies, most of these instruments are designed to provide measures of college performance, attitudes or perceptions. The following instruments were created for the specific purposes of this study:

- Six Performance Characteristics Rating
- Alverno College Attitude Survey
- Alverno College Student Perspectives Interview
- Alverno College Alumna Perspectives Interview
- Alverno College Student Careering Questionnaire
- Alverno College Alumna Careering Questionnaire
- Management Performance Characteristics Inventory
- Management Careering Questionnaire

In addition to this instrument development work, we also realized that the state of the art in developing college outcomes measures was such that we could expect to either contribute to or work toward the validation of the instruments we were using as external criterion measures. First, we validated both the Integrated Competence Seminar (Alverno College Assessment Committee/Office of Research and Evaluation, 1982) and the Six Performance Characteristics Rating (Alverno College Assessment Committee/Office of Research and Evaluation, 1983). The Alverno College Attitude Survey (Mentkowski, 1977a) was tested for reliability and different forms were created for students in each of two major programs, and one type of scaling was compared against another (Mentkowski & Doherty, 1979). The Alverno College Student/Alumna Perspectives Interviews (Mentkowski & Much, 1980a; 1980b) were revised. The student interview was created after initial pilot work where students were interviewed with an even more unstructured open-ended interview (Mentkowski, 1977b). The alumna interview was revised following the first five interviews to clarify the questions.

In regard to the Human Potential Measures, we conducted an extensive validation of the instrument measuring the Perry scheme (Mentkowski, Moeser & Strait, 1983). We carefully described our procedures for establishing and maintaining the reliability and validity of the ratings for the Sentence Completion Test of ego development (Mentkowski, Miller, Davies, Monroe & Popovic, 1982). We collaborated with McBer and Company on the Cognitive Competence Assessment Battery by exchanging data, so that both Alverno and McBer had access to the most up-to-date information on the validity of the measures. And we collaborated with David Kolb and Glen Gish on the validation of the Adaptive Style Inventory.

Score Instruments

We employed three general strategies for ensuring the validity of our instrument scores. First, we trained the administrators of the instruments, and kept extensive records on the procedures for administration so that there would be comparability in the administration of the instruments, especially over the five years of a longitudinal study (Mentkowski & Doherty, 1977, 1979, 1980a, 1980b). We also provided our interviewers with extensive training, and also trained our coders of qualitative interview data (Mentkowski, DeBack, Bishop, Allen & Blanton, 1980; Mentkowski, O'Brien, McEachern & Fowler, 1982). Further, we consulted with instrument designers and their colleagues for all but one of the instruments (Watson and Glaser, 1964), and participated in workshops that provided training by Lee Knefelkamp, for the coding of data from the Measure of Vocational, Educational and Personal Issues (Measure of Intellectual Development), for the Behavioral Event Interview by George Klemp and David McClelland, and for the Sentence Completion Test by Jane Loevinger.

We knew from the outset that using production type tasks as college outcomes measures would require a large effort in the scoring and/or coding of the instruments. In order to accomplish this task, we used expert scorers outside the college for assistance. Scorers at McBer and Company directed by Ann Litwin completed scoring of the Analysis of Argument, Test of Thematic Analysis, Picture Story Exercise and Life History Exercise, and initially for the Test of Cognitive Development (see Winter, McClelland and Stewart, 1981, for details). The Moral Judgment Instrument was scored by John Gibbs and Clark Power from the Center for Moral Education at Harvard University. The Measure of Vocational, Educational and Personal Issues (after Perry) was scored at Alverno, initiated by a workshop from Lee Knefelkamp and further input from William Perry, since Alverno was engaged in an extensive validation of the process for judging student performance on the Perry scheme (Mentkowski, Moeser & Strait, 1983). The Sentence Completion Test of ego development was also scored at Alverno with input from two scoring workshops conducted by Jane Loevinger at Washington University (Mentkowski, Miller, Davies, Monroe & Popovic, 1982).

The Learning Style Inventory and the Watson Glaser Critical Thinking Appraisal were scored by hand at Alverno. The Defining Issues Test and the Adaptive Style Inventory were computer scored at Alverno with programs provided by James Rest and David Kolb, respectively. Alverno scored the performance characteristics inventories for the management and nursing studies with consultant assistance from George Klemp and David McClelland, and Alverno coded data from the careering questionnaires.

Throughout the work, we experimented with various ways to analyze the open-ended interview data from the study of student/alumna perceptions. Our methods ranged from creating a codebook specifying developmental levels of categories and examples, to a detailed analysis using all relevant parts of the data related to a question or category, to reading selected interview examples and generating a description of the overall findings. An outcome of this work is that we confirmed that an in-depth analysis of the material required a social science background in qualitative data analysis.

During the course of scoring the instruments, we created two detailed assessment processes and did extensive work to ensure their validity. One was created in collaboration with Lee Knefelkamp for scoring essays for the Perry Scheme (Mentkowski, Moeser & Strait, 1983), and one process was created in collaboration with George Klemp for deriving competences from the Behavioral Event Interview from the nursing study (Mentkowski, DeBack, Bishop, Allen & Blanton, 1980) and for coding the Behavioral Event Interview (McBer and Company, 1978) for the management study (Mentkowski, O'Brien, McEachern & Fowler, 1982).

Throughout the scoring and coding of all the data, we maintained contact with the instrument designers with one exception (Watson and Glaser). We recognized that we needed to keep up to date with the latest information on the validation of the instruments, but more important, that the measures themselves could benefit from the results of a five year longitudinal study employing them. These results can greatly enhance our understanding of the meaning of the instruments because they were given as a battery and could therefore be interrelated. This is particularly important since many of the instruments are just being developed. In addition, we can provide data on women's abilities.

Another outcome of this extensive work is that we have been able to disseminate some methodology useful to educators. The criteria and process used to judge student performance on the Perry scheme (Mentkowski, Moeser & Strait, 1983), the Behavioral Event Interview process (Mentkowski, DeBack, Bishop, Allen & Blanton, 1980; Mentkowski, O'Brien, McEachern & Fowler, 1982), and the strategies for interviewing students have all been effective in various other projects here at Alverno (Schall & Guinn, Note 3), and some other campuses.

Select Data Analysis Strategies

Data analysis strategies were chosen following reviews of available methodology. James Rest and Mark Davison of the University of Minnesota and Marcus Lieberman of the Center for

Moral Education provided us with several suggestions and insights useful in the analysis of the longitudinal data from the Human Potential Measures. George Klemp guided our analysis of the data from the studies of professional competence in management and nursing. Finally, our Evaluation Advisory Council, Donald Grant of the University of Georgia, Milton Hakel of Ohio State University, and Joel Moses of AT&T, aided us in the validation and development of our college performance and performance characteristics measures (Integrated Competence Seminar; Six Characteristics Rating).

Instrument Descriptions[2]

A brief description of each set of instruments is given below. Research reports describe the instruments in more detail.

Human Potential Measures: Cognitive Development

Test of Cognitive Development
(Renner, et al., 1976; after Inhelder & Piaget, 1958)

By having a student work a series of problems and provide reasons for answers, this instrument measures a student's cognitive activity based on Piaget's stages of cognitive development. The measure is more narrowly focused on a single stage of cognitive development, formal operations.

Sentence Completion Test (Loevinger, 1976; Loevinger, Wessler & Redmore, 1970; Loevinger & Wessler, 1970)

A production task elicits a measure of an individual's stage of ego development. Ego here is defined as one's style of life, the unity of personality, individuality, the method of facing problems, opinion about one's self and the problems of life, and the whole attitude toward making choices in all life spheres (Loevinger & Knoll, 1983).

Moral Judgment Instrument (Kohlberg, et al., 1978; Kohlberg, 1981a, 1981b; Colby, et al., in press)

This production task elicits response to a moral dilemma. The instrument provides a measure of an individual's stage of moral development by analyzing the reasoning a person gives in response to questions that probe reasoning about moral issues and orientations that create and define moral dilemmas.

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[2] Sources for information on instrument availability, administration and scoring are found on page 85.

Defining Issues Test (Rest, 1979a, 1979b)

Rest's instrument (based on Kohlberg's theory of moral development) provides a measure of an individual's moral development in a recognition task by analyzing the relative importance attributed by a person to principled moral considerations. A person attributes importance to several reasons given for resolving a particular moral dilemma, and then rank orders them.

Measure of Vocational, Educational, and Personal Issues (Knefelkamp, 1974; Widick, 1975; Revised for Knefelkamp & Slepitza, 1976; after Perry, 1970; now titled the Measure of Intellectual Development; Mines, 1982)

This production task measure of the Perry scheme of intellectual and ethical development asks students to write three essays describing "the best class you've taken...," "a decision about something that had major importance...," and "things you consider when approaching the question of career choice... ." The essays are judged for position on the Perry scheme of intellectual and ethical development, using the Alverno Criteria (Mentkowski, Moeser & Strait, 1983).

Human Potential Measures: Learning Styles

Learning Style Inventory (Kolb, 1976)
Adaptive Style Inventory (Kolb, 1978)

The Learning Style Inventory is a measure of individual learning styles which affect decision-making and problem-solving. The four styles are Concrete Experience, Reflective Observation, Abstract Conceptualization, and Active Experimentation. This recognition task requires the student to rank order descriptive statements about the mode of learning. The Adaptive Style Inventory measures the extent to which the person is likely to use each mode in various situations, and assesses for adaptive competence through a recognition task.

Life History Exercise (Klemp & Connelly, 1977)

This instrument using a recognition task is a measure of interpersonal learning skills. The cases are programmed in such a way that a person with good judgment about people (i.e., one who does not make snap, impulsive judgments) will become more accurate in choices of the correct alternative as the respondent proceeds through the case. The instrument assesses how one uses information in making decisions about others or predicting behavior and examines the process by which decisions are made.

Analysis of Argument (Stewart, 1977a)

This instrument is intended to assess intellectual flexibility by requesting the student to argue against a controversial opinion, and then defend the opinion just attacked. The measure uses a production task.

Test of Thematic Analysis
(Winter, 1976; Winter & McClelland, 1978)

This instrument consists of two sets of three stories. Students are asked to compare the sets thematically, a production task. This "thematic analysis" is scored according to twelve categories of critical thinking. This test is based on an understanding of cognitive development defined as the ability to analyze new information and to synthesize new concepts based on this information, and reflects the ability to integrate information into one's own cognitive structure. As the cognitive structure grows, so does the ability to think critically, to make a cogent argument and to reason inductively.

Picture Story Exercise (Winter, McClelland & Stewart, 1981)

The instrument requires the student to write narratives to six pictures. This instrument, modeled on the Thematic Apperception Test (Morgan & Murray, 1935), is used to assess a variety of abilities. One is "self-definition" which emcompasses the way one thinks about the world and one's self, the way one reacts to new information, and the way one behaves (Stewart & Winter, 1974). People with high cognitive initiative are not only able to think clearly, but also to reason from problem to solution, and to propose to take effective action on their own. This instrument is also used to assess Need for Achievement (McClelland, et al., 1953), Affiliation (Atkinson, 1958), Power (Winter, 1973) and Activity Inhibition (McClelland, 1975). Stages of Adaptation, a measure of ego development created by Stewart (1977b, 1982) after Freud and Erickson, are also scored from the Picture Story Exercise.

Watson-Glaser Critical Thinking Appraisal (Watson & Glaser, 1964)

This is a traditional and time tested recognition task measuring several components of critical thinking. Inference, Recognition of Assumptions, and Deduction were used in the current study.

Measures of Student Performance in the Learning Process

Academic Reports: Progress (Mentkowski & Strait, 1983)

Several indicators of progress through the curriculum are: number of semesters attended; number of credits achieved; and number of competence level units achieved at any one point in time.

External Assessments: Integrated Competence Seminar
(Alverno College Assessment Committee/Office of Research and Evaluation, 1982)

This assessment technique provides an opportunity for a student from any discipline to demonstrate integration of her abilities developed by the midpoint of her college education. The student shows how she transfers these abilities to a new and complex simulated situation she is likely to face as a college-educated person. The student is not credentialed on this instrument; it is used for diagnostic purposes only. Thus, the ICS is, in part, an external criterion measure of the student's ability to transfer her learning after completing the general education sequence. The student performs three exercises over a four hour period as a member of a decision-making board of citizens: Oral Presentation, In-Basket, and Group Discussion. Off-campus professionals serve as assessors, who individually observe and evaluate each student's performance against specified criteria, come to consensus, prepare a written evaluative statement, and meet individually with each student to provide feedback on her performance. This instrument has since been revised.

Integrated Evaluation: Six Performance Characteristics Rating
(Alverno College Assessment Committee/Office of Research and Evaluation, 1978, Revised 1979)

Six cross-disciplinary performance characteristics were identified and defined by the faculty (Alverno College Faculty, 1977) to describe the student's developing ability to interrelate and internalize performing the competences. At the present time the faculty have defined five characteristics which apply to her behavior--Integration, Independence, Creativity, Awareness, Commitment--and a sixth--Habituality--which modifies the others. The development of these characteristics takes place initially as the student strives to acquire or to improve abilities demanded by her discipline or profession. Gradually, the characteristics themselves become central to her style of working and to her exercise of personal responsibility. Faculty think of these characteristics as contributing to her personal and professional life, and incorporate assessment of them into a longitudinal evaluation program. Each first and second year student in the Weekday College is rated on each of the characteristics by an instructor at the end of each year in college. Each third and fourth year student receives two independent ratings from two professors in her area of specialization and one rating from a professor in her minor area.

Measures of Student/Alumna Perceptions of Learning and Careering

Alverno College Student Perspectives Interview
(Mentkowski & Much, 1980b; In Much & Mentkowski, 1982)

This interview is designed to enable students to speak for themselves about their college experiences. It measures students' perspectives on many aspects of college learning. It is open-ended and probes students' thinking, asking them to describe their perceptions of learning, how they have changed, and why. Questions that focused the design of the interview questions are also included.

Alverno College Alumna Perspectives Interview
(Mentkowski & Much, 1980a; In Mentkowski, Much & Giencke-Holl, 1983)

Similar in form to the interview for students, this interview focuses on an alumna's perspectives on transfer processes, new learning, careering and professional development and integration of personal and professional roles. The open-ended questions and probes ask her to draw relationships between college and her life as it is now. Design questions are included.

Alverno College Attitude Survey
(Form A and Form B) (Mentkowski, 1977a)

The Attitude Survey is an objective questionnaire measuring students' perceptions of and attitudes toward a variety of areas such as: "Alverno," "Faculty," "Changes," "Syllabi," "Performance," "Professional Development," "Assessment Center," "Competence Level Units," "Challenge," "Progress," "Social Life," "Advising," "Career Development," "Need for Structure," "Learning Modes," "Confidence," "Library, Student Activity, Residence Hall," and "General Issues."

Alverno College Student Careering Questionnaire
(Mentkowski & Bishop, 1981; In Mentkowski, Much & Giencke-Holl, 1983)

This careering questionnaire is administered to graduating seniors and includes questions in an objective format that requests information on the following: paid and unpaid work experience before, during and after college; field experiences, clinical experiences, student teaching and participation in Alverno's Off-Campus Experiential Learning Program; salary before college and now; expectations for getting a job and changing jobs; expected job area and title; expected salary range; ratings of college preparation for future job performance; expectations of future job satisfactions and potential for advancement; expectations for performance on job-related exams; expectations for continued schooling; self-description of motivation to learn; rating of the effectiveness of the Alverno experience; satisfaction with current choice of major or career; expectation of advantage of a college degree in getting a job; ratings of 37 general and specific goals expected to result from college on three variables (goal importance, goal preparation from Alverno, and current goal achievement); parents' occupations, number of children, marital status. Attitudes toward working and sources for financing college are also included in the revised instrument.

Alverno College Alumna Careering Questionnaire
(Mentkowski & Bishop, 1980a; In Mentkowski, Much & Giencke-Holl, 1983)

This careering questionnaire includes the questions contained in the instrument for Alverno graduates, but it is worded to collect data on information such as work experience since graduation; success in obtaining a position related to a chosen career; current salary, salary increase; ratings of career preparation; potential for satisfaction and potential for advancement in the first position held after graduation; reasons for not seeking paid employment after graduation; performance on exams related to obtaining a job; continued education; satisfaction with college career choice; ratings of goals now; membership in career-related associations; and membership in civic or other organizations.

Measures of Professional Performance, Perceptions, and Careering and Professional Development

Behavioral Event Interview
(Klemp, 1978; McClelland, 1976, 1978)

This critical incident technique elicits six situations which the professional identifies as effective or ineffective. The professional, guided by the interviewer, describes each situation, who was involved, and the outcome, but primarily focuses on what he or she actually did in the situation, and what he or she was actually thinking, feeling and intending at the time. Interview transcripts are used to create the Behavioral Event Interview Writeup from which competences can be derived or coded.

Behavioral Event Interview Writeup (Alverno College Office of Research and Evaluation, 1980; after McClelland, 1978; In Mentkowski, O'Brien, McEachern & Fowler, 1982)

Interview content from the Behavioral Event Interview transcript is summarized in written form as soon as possible after the interview. The form calls for a description of each incident, the components of the incident, the participant's job responsibilities, and the characteristics he or she thinks necessary for outstanding performance. For each incident, the participant's behavior is described in detail, and what she was thinking, feeling and intending at the time. The result or outcome is also described. Information that would identify the participant is deleted.

Nursing Nomination Questionnaire (after Klemp, 1978)

The nomination questionnaire is a two-page instrument that briefly describes the study and asks participants to list those professional peers whom they consider to be "outstanding." Space is allotted for ten names. Participants are asked to list as many "outstanding" peers as they can from memory.

Nursing Job Element Inventory (Grau & Rutter, 1977)

The Job Element Inventory is comprised of a list of 120 performance characteristics nurses identified as necessary for "outstanding" or "superior" job performance. The purpose of the inventory is to ascertain the behaviors/characteristics participants think nurses must possess for outstanding nursing performance. Participants respond to the list three separate times. They check those behaviors they believe (1) distinguish "outstanding" from "good" nurses who share their job title, (2) characterize "marginal" nurses who share their job title, (3) are more important in hiring or training for their job.

Nursing Careering Questionnaire (Grau, 1977)

In objective format, the questionnaire elicits information about marital status, number of dependents, year of licensure, years of nursing experience, type of educational preparation for licensure, current educational pursuits, an estimate of future educational endeavors, job satisfaction, and self-evaluation of job performance. The measure was used to categorize interview participants on educational background, years of nursing experience, hours of employment per week, marital status, job satisfaction and self-perception of performance.

Management Performance Characteristics Inventory
(Bishop, Mentkowski, O'Brien, Birney, Davies & McEachern, 1980; In Mentkowski, O'Brien, McEachern & Fowler, 1982)

Each manager is asked to judge each of 162 statements or performance characteristics (1) as relevant to one's own work experience, (2) as essential to selection and training, and (3) as characteristic of outstanding performers. Characteristics that meet all three criteria for judgment are then considered to be descriptive of effective management performance from the point of view of the managers studied. Through an item scoring procedure, characteristics that discriminate average from outstanding performers are identified.

Management Careering Questionnaire (Mentkowski & Bishop, 1980b; In Mentkowski, O'Brien, McEachern & Fowler, 1982)

This measure collects information on several variables related to careering and professional development. Information is gathered from the manager on job responsibilities and function, who the manager reports to and who reports to the manager, position level and type, experience in the company and the last position the manager held in her previous company. The manager also reports levels of education completed and in progress, area of specialization, and completion of a management training program. Number and breadth of professional activities not sponsored by the company are also indicated. Personal information includes marital status, number of children, number of roles, husband's occupation, mother's and father's occupation, parents' occupational status, number of siblings, and birth order.

Instrument Sources

The description of each instrument is found on pages 78-85 of the text. The following list can assist the reader in gaining information about instrument availability, administration and scoring.

Integrated Competence Seminar
Six Performance Characteristics Rating
Alverno College Student Perspectives Interview
Alverno College Alumna Perspectives Interview
Alverno College Attitude Survey
Alverno College Student Careering Questionnaire
Alverno College Alumna Careering Questionnaire
Management Performance Characteristics Inventory
Management Careering Questionnaire
Nursing Nomination Questionnaire
Nursing Job Element Inventory
Nursing Careering Questionnaire
Perry Scheme scoring criteria in Mentkowski, Moeser & Strait, 1983

Alverno Office of Research and Evaluation
Alverno College
3401 South 39th Street
Milwaukee, Wisconsin 53215

Learning Style Inventory
Life History Exercise
Analysis of Argument
Test of Thematic Analysis
Picture Story Exercise
Behavioral Event Interview
Job Competence Assessment

McBer and Company
Test and Scoring Division
137 Newbury Street
Boston, Massachusetts 02116

Moral Judgment Instrument
(in Colby, et al., in press)

Lawrence Kohlberg
Center for Moral Development and Education
Harvard University
Larsen Hall, Appian Way
Cambridge, Massachusetts 02138

Defining Issues Test
(in Rest, 1979 a and b)

James Rest
Minnesota Moral Research Projects
330 Burton Hall
178 Pillsbury Drive S.E.
Minneapolis, Minnesota 55455

Measure of Vocational, Educational, and Personal Issues
(now called the Measure of Intellectual Development)

Lee Knefelkamp
Counseling and Student Personnel Services
College of Education
University of Maryland
College Park, Maryland 20742

Learning Style Inventory (see McBer above)
Adaptive Style Inventory

David Kolb
Department of Organizational Behavior
Sears Library Building
Case Western Reserve Library
Cleveland, Ohio 44106

Watson-Glaser Critical Thinking Appraisal

Harcourt, Brace, Jovanovich, Inc.
757 3rd Avenue
New York, New York 10017

Test of Cognitive Development

John Renner
University of Oklahoma
School of Education
Norman, Oklahoma 73069

Sentence Completion Test
(in Loevinger et al., 1970 and Loevinger & Wessler, 1970)

Jane Loevinger
The Social Science Institute
Box 1202
Washington University
St. Louis, Missouri 63108

The Triangulated Validation Model

The triangulated validation model has its roots in the strategy of investigation most disciplines use in the liberal arts, that of comparison among different perspectives and ways of knowing, rather than comparison between an experimental and a control group. Thus, we aggregate findings from the same individuals using multiple measures and perspectives, use longitudinal designs where the individual is her own control, and compare results from at least three data sources or groups. This model demands in-depth studies in a single setting. Since this model represents an ongoing research program, not all possible data sources, results or comparisons among sources are complete at this time. But enough are complete after seven years to provide a tableau of findings.

The triangulated validation model is designed primarily to generate results that enable educators (1) to improve their practice and (2) to develop better theories of adult learning and life-span growth. We believe that the motivation to improve practice comes from a comparison between how a curriculum currently enhances student learning, the value added, and what educators know is still possible for a curriculum to achieve. Results from our validation model stimulate faculty motivation to improve, just as our student assessment model, with its emphasis on individual comparison of current performance against past performance, motivates the student to assimilate the feedback and improve.

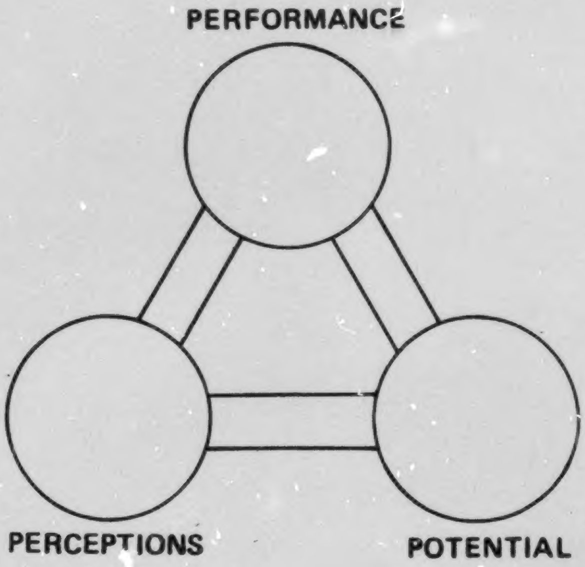
The triangulated validation model includes comparison between colleges. Indeed, we participated in a seven college comparison study conducted by Winter, McClelland and Stewart (1981) where instruments Alverno students completed were administered at other colleges. But our model does not limit such comparisons to norm-referenced measurement which has usually characterized comparisons among colleges. Rather, faculties exchange data on students, ways of teaching, and assessment strategies. The purpose of the exchange is not to compare an experimental or a "control" college or to compare colleges on some single variable or dimension of "low to high," poor to excellent. Rather, the design allows comparing and contrasting among a multiplicity of data sources and faculty teaching strategies and assessment techniques.

Student Outcomes

We studied student abilities from multiple points of view. At the first and second levels of the triangulated validation model we used a variety of lenses to capture a picture of student outcomes.

A picture of student abilities emerges from faculty-judged student performance on faculty-designed assessments. We enhance this picture by studying anonymous student perceptions of their learning. Student growth on measures of human potential drawn from outside the college give still a third picture of student outcomes. Findings that are corroborated from all three points

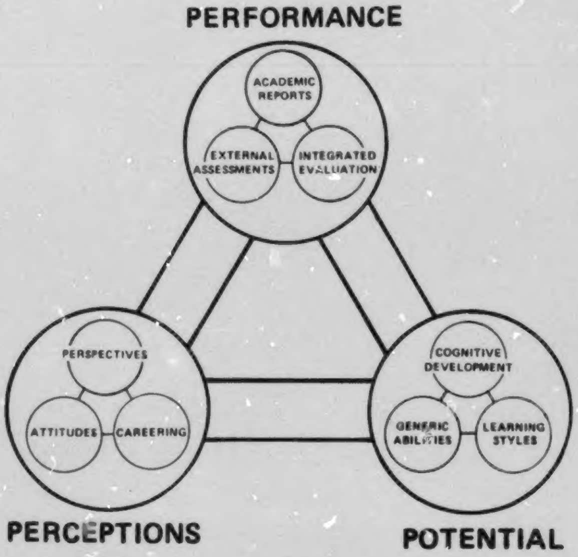
STUDENT OUTCOMES


PERFORMANCE
PERCEPTIONS
POTENTIAL

of view are considered to have relatively more validity than results that emerge from only one or two.

It is also clear from the next illustration, and the previous review of instruments, that within each of these three dimensions of student outcomes we used at least three kinds of measurement, employing both recognition and production tasks.

STUDENT OUTCOMES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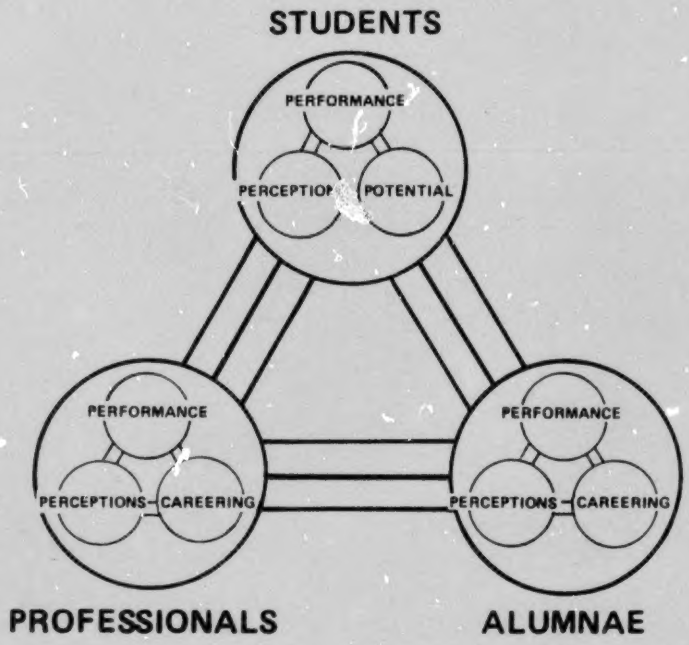
CAREERING
COGNITIVE DEVELOPMENT
GENERIC ABILITIES
LEARNING STYLES
PERCEPTIONS
POTENTIAL

To study performance, we used academic reports of student progress in the curriculum, an external assessment (Integrated Competence Seminar) and an integrated evaluation that consisted of a faculty rating of how students demonstrated their abilities (Six Performance Characteristics Rating). Our study of perceptions included a perspectives interview, a survey of attitudes, and a questionnaire of careering expectations and goals. We studied the human potential of our students from three separate theoretical frameworks: theories of cognitive-development, experiential learning theory and learning styles, and measures of generic abilities where the abilities are expected to link education and work performance.

We also studied abilities across multiple points in time. We recognized that we needed to create a picture of student outcomes that would result in a series of at least three photographs of a student's emerging abilities. Thus, we created a cross-sectional and longitudinal data base, conducting sets of parallel studies. The longitudinal results allow us to describe the patterns characteristic of intra-individual development and the unique ways students develop these outcomes.

Student, Alumna and Professional Outcomes

We studied abilities using multiple groups. We wished to widen the lens, to examine the abilities of our students as alumnae, and to study professionals who were not our students.

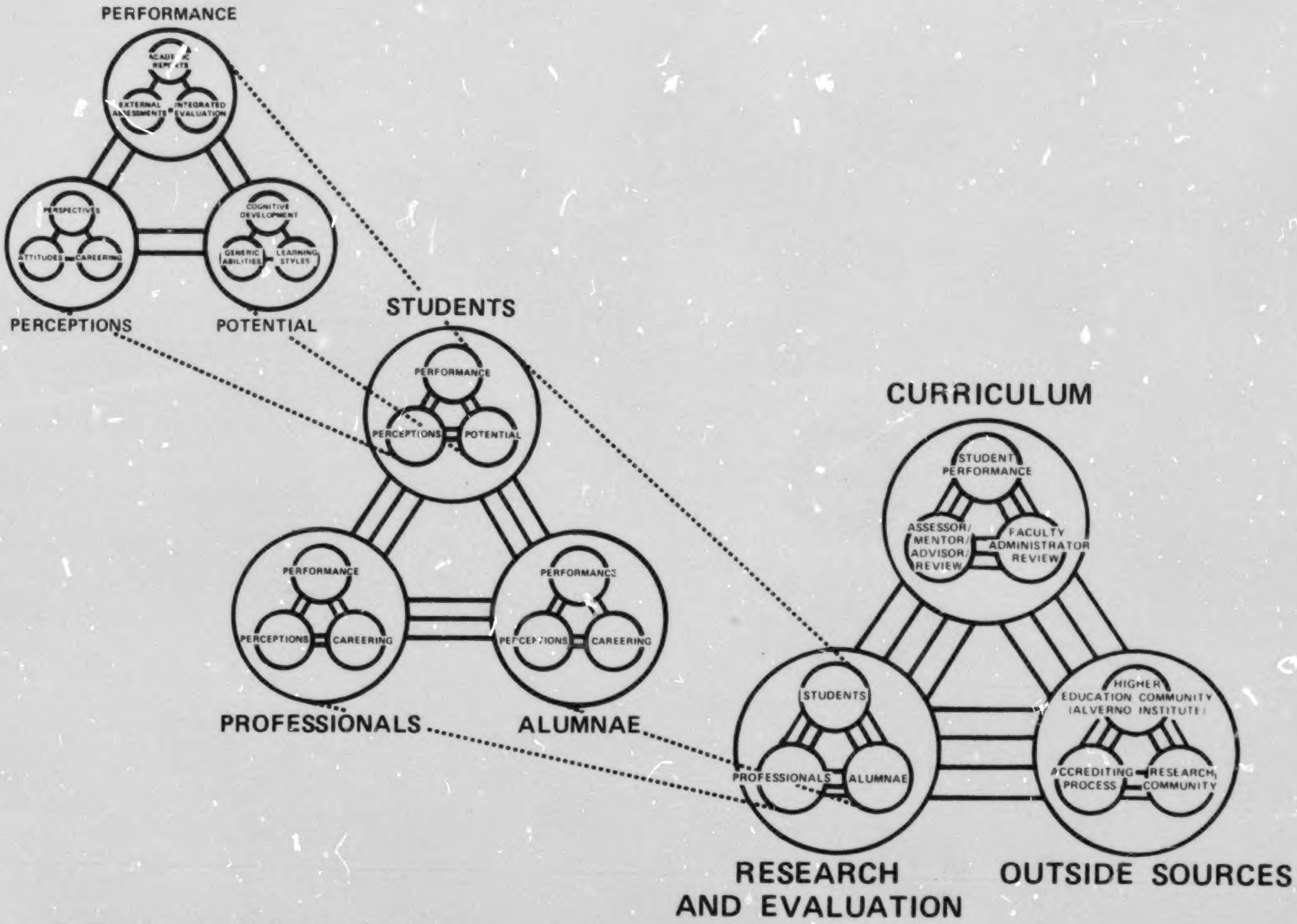


Similarly, we selected instrumentation that would enable a comparison of findings from at least three kinds of measures. Student assessments are described above. We studied alumnae perceptions through a perspectives interview, alumnae careering through a questionnaire, and inferred alumnae performance through the interview. Future studies will use independent measures of performance. Professionals' perceptions were studied through ratings of abilities critical for education, selection and performance. Professionals' careering was measured through a questionnaire. A behavioral event interview tapped critical incidents of effective and ineffective professionals' performance.

Research and Evaluation, Curriculum and Outside Sources

Finally, we studied abilities such that we had multiple opportunities for critique and comparison. We created a context for validation research by establishing evaluation as a concept and function in the curriculum. We responded to the concerns of students, faculty and professionals, consistently respecting the values and goals of the program and the research participants. Further, we collaborated with colleagues outside the institution in conducting the research. Figure 5 further reflects similar characteristics of our research efforts once the results are in. Figure 5 depicts all four levels of the triangulated validation model. The fourth level consists of the validation model from the research and evaluation component of the instructional system researching student, alumna and professional outcomes and depicts the opportunities for critique and comparison with other data sources from the curriculum and from outside sources.

Findings from the study of students, alumnae and professionals gained through systematic research and evaluation are compared by the Office of Research and Evaluation staff and the faculty to the data generated from various sources in the curriculum. These include student performance on the full range of over one hundred performance assessments all students complete (as opposed to data from only those students who were participants in the research designs), data from regular course evaluations completed by students, and so on. Data from faculty and administrator review processes systematically evaluate student performance and curriculum structures. The first five research reports emerged in part from these internal evaluation processes (Alverno College Assessment Committee/Office of Research and Evaluation, 1980, 1982, 1983; Friedman, Mentkowski, Deutsch, Shovar & Allen, 1982; Friedman, Mentkowski, Earley, Loacker & Diez, 1980). Data also obtained from external reviewers (external assessors of student performance, mentors of students engaged in off-campus experiential learning, external advisors of discipline departments) can be compared to results from the research and evaluation source.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PROFESSIONALS
ALUMNAE
CURRICULUM
STUDENT PERFORMANCE
ASSESSOR/ MENTOR/ ADVISOR/ REVIEW
FACULTY ADMINISTRATOR REVIEW
STUDENTS
PROFESSIONALS
ALUMNAE
HIGHER EDUCATION COMMUNITY (ALVERNO INSTITUTE)
ACCREDITING PROCESS
RESEARCH COMMUNITY
RESEARCH AND EVALUATION
OUTSIDE SOURCES

Figure 5. The triangulated validation model.

Data from the research and evaluation sources and from the other sources in the curriculum can come up against further critique from a review of peers and through comparison with data from similar instruments administered to other colleges in the research community. The accrediting process is another source of further data and critique. Perhaps the most dynamic and systematic critique and comparison occurs in the Alverno Institute, the institutionalized structure whereby findings are exposed in presentation and dialogue to the critique and review of the higher education community. The section on dissemination in this report details the number of colleges that have attended seminar days or week-long workshops where they have received consistent reports of the progress and findings of the research. Input and questioning by our learned colleagues creates a continuous dialogue, critique and review.

The four levels in this triangulated model are our attempt to ensure that results emerge from multiplicity in measurement and theoretical frameworks. Since the college is conducting its own research and evaluation, it is critical that we build externality into every level of the triangulated model. At the instrument level, multiplicity in measurement ensures breadth in qualitative and quantitative assessment; multiplicity in theoretical frameworks controls for bias in perspective and allows comparison between the faculty's own theories of learning and assessment and those drawn from outside the college. At the level of student outcomes, measurement of performance and perceptions are comprised of Alverno-designed instruments; measures of potential are drawn from outside the college. At the third level of the validation design comparing student, alumna and other professional outcomes, professionals were drawn from groups of individuals who were not Alverno students or alumnae. At the fourth level, research and evaluation outcomes are compared to outcomes within the Alverno curriculum, but they are again compared with outside sources. Thus, multiple, external opportunities for critique and comparison are built in at every level of the triangulated model.

WHAT ARE THE OUTCOMES OF AN ALVERNO COLLEGE EXPERIENCE?

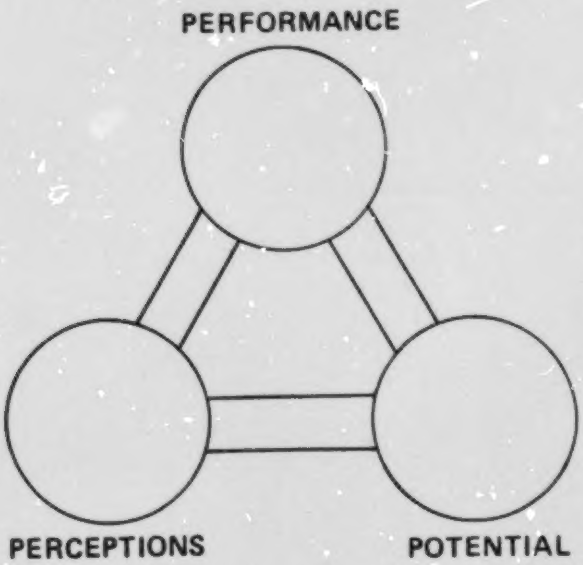
Can an ability-based curriculum really make a difference? Can it promote the kind of broad personal and intellectual development that lasts a lifetime? Can it enhance a person's skills, and improve one's chances at having an effective career? Can it benefit the "new" students--adults, women, minorities--as well as traditional students? Do the abilities learned show up on the job?

Because this is an ongoing project, consisting of interrelated studies, we do not anticipate one set of "final" results. Most of our studies are continuing and will continue for several years. What we can report, after seven years, are preliminary results in our major areas of inquiry. For this overview and summary, we discuss results from the ten research reports under two major headings, "What are the Outcomes of an Alverno College Experience?" and "How Do Alverno College Outcomes Relate to the World of Work?"

We have also been able, along the way, to make some contributions to the newly developing field of educational program evaluation and to the repertoire of procedures for validating developmental outcomes. It is for this reason that this report has included an overview and summary of the research methodology as well as the rationale and results. In addition, our work seems to be offering some substantive support for the goals of outcome-centered, ability-based curriculum design.

We have taken three independent approaches to measuring the meaning and development of the broad abilities the Alverno curriculum is expected to foster. These are: (a) student *performance* on college-designed ability measures within the curriculum (Alverno College Assessment Committee/Office of Research and Evaluation, 1980, 1982, 1983; Friedman, Mentkowski, Deutsch, Shovar & Allen, 1982; Friedman, Mentkowski, Earley, Loacker & Diez, 1980; Mentkowski, O'Brien, Cleve & Wutzdorff, 1983), (b) student *perceptions* of the reasons for learning, the process of learning, and its value for their own career and life goals (Much & Mentkowski, 1982), and (c) student performance on twelve measures from outside the college describing human *potential* for growth in cognitive development, learning styles, and generic abilities (Mentkowski & Strait, 1983). Results are based on longitudinal and cross-sectional studies with over 750 women students aged 17-55. A core group of 200 of these make up the longitudinal participant group. Seventeen measures generated 17,500 responses; about 365 longitudinal interviews complete the student outcomes data base.

STUDENT OUTCOMES



We have seen significant change in all three kinds of measures. These changes confirm that students do change in their developing cognitive patterns and abilities--whether these are defined by faculty or by other practitioners and researchers--and that students' own perceptions and uses of learning change concurrently. Before we describe the major findings from the research reports, we will recap the distinctive features of the Alverno curriculum so the reader may review the context for these changes in student outcomes.

The Alverno Curriculum: A Recap

Abilities

In redesigning our curriculum in the early seventies, we built in several elements based on experience in teaching and assessing students (Alverno College Faculty, 1976). First, abilities that we identified were complex and included knowledge, skill, self-perception, disposition, attitudinal and motivation aspects. Second, abilities were defined to make them teachable, assessable and transferable across settings. The abilities are:

Communications
Analysis
Problem Solving
Valuing in Decision Making
Social Interaction
Taking Responsibility for the Environment
Involvement in the Contemporary World
Aesthetic Response

Teaching Strategies

Faculty designed teaching strategies to develop these abilities across the curriculum within the regular course structure. In addition, the experiential dimensions of the curriculum were expanded. Students in each of the 20 academic and professional programs engage in sponsored off-campus experiential learning where transferring abilities learned in college is paramount. Classroom experiences likewise focus on involvement in learning situations where simulations and other concrete experiences, as well as reflection, conceptualization, and action plans are tested. Because all students are required to demonstrate their abilities in successive, increasingly complex performance assessments, the abilities form a kind of "core curriculum" within the traditional discipline-based one. Faculty integrate these process abilities with the content of the disciplines.

Assessment

Central to the curriculum is a complex assessment process whereby student demonstration of these broad abilities is evaluated (Alverno College Faculty, 1979). Developing and making explicit the criteria for assessment is a faculty effort to define these abilities and make them operational. Thus, faculty create criteria or descriptive statements that give themselves and students a picture of the ability to be assessed. Abilities are then inferred from performance. The student, the faculty, and external assessors from the Milwaukee professional and business community use these criteria to evaluate student strengths and weaknesses in performance situations.

Assessment thus defined and implemented becomes an opportunity for learning. The assessment process provides a mirror of where the student is in her learning and what abilities she still needs to develop. Detailed feedback is given and practice of abilities is structured. Because assessment focuses on the application of abilities, students learn to tie knowledge, theory, motivation, and self-perceptions to productive action. Each student demonstrates her abilities in ways similar to the way the ability is usually expressed (e.g., Social interaction is assessed through group problem solving). Assessment thus contributes significantly to learning because the student is required to demonstrate abilities in many courses and multiple settings.

Further, faculty make a concentrated effort to assist the student to recognize her own perspective on learning and her learning styles, to negotiate this new learning environment, to integrate her learning across courses, and to link learning in college to her career and civic life. Seminars for all beginning students focus on these goals.

Elements of Ability-Based Learning

What is different about the way ability-based learning at Alverno is taught? Elements of student learning that were formerly assumed to be learned from the broad effects of the residential college atmosphere or as an outcome of completing a variety of courses have been explicitly defined. These core abilities are consistently fostered and assessed across the curriculum. For example, all students, including those who are not "joiners," who focus only on "getting A's," or who leave classes not for the gym or the editorial board of the school paper but for job and/or family responsibilities, must demonstrate interactive abilities in the curriculum. Both the research findings and our experience have confirmed that faculty cannot take for granted that even the experienced adult student has mastered interactive skills, their application, or their integration with other abilities.

Not only is ability development consistently fostered across the institution, but the faculty have organized themselves to ensure that it happens. Take, for example, analytical ability. All our faculty have redesigned their courses to foster the development of this ability within the context of their particular disciplines. By infusing criteria for analytical ability into teaching/learning activities, assignments and assessments, faculty create an environment with a consistent message about learning. Another example is an aspect of communication ability, writing. relegated to English classes; all professors develop that ability, are aware of writing criteria, and ask students for application of writing skills in their courses, translating the criteria into the context of a particular discipline (develop a speech on your project for the next science convention; write up your results in scientific form). Thus, students cannot avoid development of these critical abilities. Reinforcement of abilities is pervasive, and faculty work to define them, and to identify the unique ways abilities are expressed by students. It is not any particular teaching technique (group discussion, internships, experience-based learning in the classroom, self-assessment using one's videotaped speech, skill classes to prepare for college courses) that characterize the faculty's overall strategy. Rather, it is the systematic, constantly evaluated use of these strategies, in relation to what is learned and the student's developmental level, that characterizes the faculty's approach.

Assessment is an important part of the learning process. Teaching strategies incorporate an assessment process that makes student/faculty interaction and systematic, detailed feedback an expected part of learning. Students are not in the dark about how they need to improve, relying only on a "B" or the comment "good work" to guide the development of their next project.

There is a set for learning that crosses disciplines, and continues after college. This set includes the value of continuous self-assessment against the standards of peers, faculty, external assessors and the discipline or professional area. Since assessment is a process, learning is seen as continuous, where performance incorporates not only knowledge, but its application. The student experiences this consistent message about learning, and about becoming independent and autonomous in directing and assessing her own learning.

Finally, the institution itself is student-focused. Demands for the consistent and common reevaluation, research and redefinition of abilities, their teaching and their assessment comes from a systematic attention to student outcomes, and student perceptions of their learning. New student populations, new student problems, new issues for students are the driving force of institutional change, coupled with organizational mechanisms that ensure that well thought out change occurs, and that these changes are consistently evaluated. Change is a collaborative faculty effort, just as the development of the curriculum and its evaluation is a collaborative effort which transcends departments and divisional structures.

Student Changes in Performance on College Defined Abilities

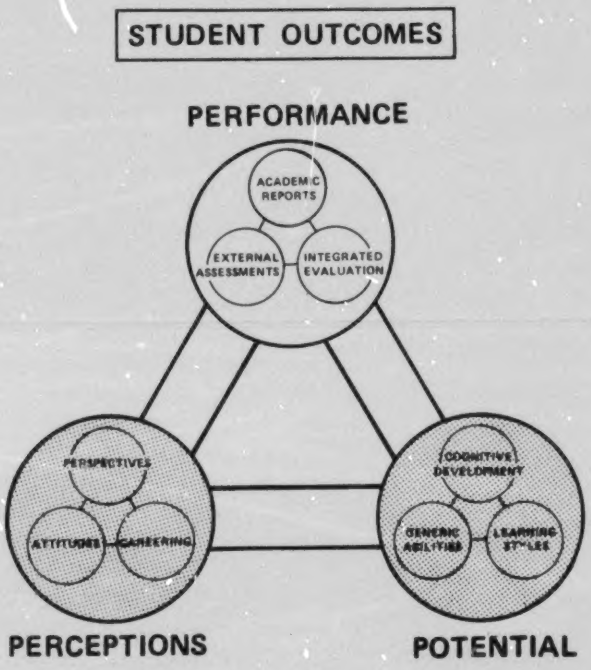
Students Learn Complex Abilities in the Curriculum

Students have consistently shown change on the college's own measures designed by the faculty. Each graduate has, along the way, engaged in more than 100 active performance assessments in her various courses. Faculty design each assessment to elicit a particular level of one of eight major abilities, using the course's discipline content as a context. Each graduate's performances have been variously assessed by faculty, peers, and community professionals (and always by herself), according to criteria that remain stable across all disciplines.

We think it is important that so many students have shown consistent change through this complex network of performance measures. It suggests that the complex outcomes identified by the faculty are indeed developable, and *visible in performance* to both faculty, students, and professionals from outside the college; that a complex ability is *recognizable across settings*, despite the varied forms it may take in different disciplines and professional environments; and that such abilities can be *developed sequentially* to increasingly complex levels.

From a validation point of view, two questions immediately arise. First, what broad measures of student performance in the curriculum are appropriate indicators of student outcomes, such that changes on these measures could be related to changes on measures of human potential drawn from outside the college? Second, are the college's assessment measures themselves valid? And do the faculty indeed share the kind of consensual perception of student performances, the inter-rater reliability, so that we can be satisfied that the progress students make is actually there?

Consistent with our triangulated validation model, we selected three broad measures of student performance in the curriculum: academic reports, external assessments, and an integrated evaluation.


STUDENT OUTCOMES
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EXTERNAL ASSESSMENTS
INTEGRATED EVALUATION
PERSPECTIVES
ATTITUDES
CAREERING
COGNITIVE DEVELOPMENT
GENERIC ABILITIES
LEARNING STYLES
PERCEPTIONS
POTENTIAL

We validated these measures, along with three other faculty-designed external assessments in Communications, Valuing and Social Interaction to further test whether instructed students performed better, whether criteria were valid, and whether expert judgment is reliable.

Academic Reports

One aggregate indicator of student performance in the learning process is measured by the number of performance assessments they have completed at any one point in time. This measure allows faculty to obtain a running picture of a student's progress. Such a measure reflects the degree to which a student has performed the abilities and to what level of complexity. Number of credits achieved and semesters attended are also recorded. These measures can be used to compare students' progress on external measures. Our finding here is that students *do* vary in their *rate of learning* the abilities, which supports a curriculum design that allows for such variability.

External Assessments: Integrated Competence Seminar

Before our validation research began, the faculty had already moved to design certain out-of-class assessments that would function as external criterion measures. At the midpoint of her college career, for example, faculty required each student to participate in a half-day interactive simulation called the Integrated Comptence Seminar (ICS), designed to elicit her performance of five major abilities at once. The ICS, rated by expert judges, is a "content-fair" cross-disciplinary measure of the abilities students were developing and demonstrating in their several courses (Alverno College Assessment Committee/Office of Research and Evaluation, 1982). Assessor judgments were reliable, but the three exercises that make up the simulation differed in difficulty and validity. The "In-Basket," a measure of Analysis and Problem-Solving worked best. The measure of Social Interaction, judged from videotaped group discussion, did not correlate in the expected directions with other measures. Social Interaction is an ability that has only recently been developed through systematic instruction; perhaps we can't get a handle on an adequate measure yet. The importance of this ability for future performance at work was underscored both in studies of alumnae and professionals. Partly as a result of this study, faculty are currently testing out a substantially revised ICS, and including demonstration of all eight major abilities.

Integrated Evaluation: Faculty Rating of Student Performance on Six Performance Characteristics

Another such measure is a summary rating faculty give each student at the end of each year in college, reflecting their judgment of her overall performance on her assessments that year. That rating includes six fairly intangible performance characteristics (Awareness, Creativity, Independence, Integration, Commitment, and Habituality) which function in relation to the more tangible assessed abilities much like adverbs function in relation to a verb. Our five-year study of this rating again confirms the high agreement among faculty as expert judges, and indicates that it validly measures student change in both cross-sectional and longitudinal comparisons (Alverno College Assessment Committee/Office of Research and Evaluation, 1983). Although we have not yet been able to validate its power to discriminate among the six performance characteristics, the rating is more highly correlated with student performance on cognitive-developmental measures, than with those that measure more specific abilities. This suggests that faculty ratings on the six performance characteristics are tapping underlying patterns of student development. Faculty as a whole recognize these student differences in developmental level, and we infer that this awareness is reflected in instruction and assessment.

Faculty continue to use the rating extensively, not to accredit students but to learn more about the characteristics of performance, and to challenge their theory and practice of assessment through this shared assessment experience. Currently, faculty are reviewing both the definitions of the characteristics and the judging process for assigning ratings in preparation for developing a better instrument and expanding its use for describing the unique ways students demonstrate their abilities.

External Assessments:
Communications, Valuing, Social Interaction

Faculty have also created generic out-of-class measures for several of the eight major abilities. Each of these elicits the student's performance in that ability at the level required of all students for graduation (further "advanced" levels are required of each student in selected abilities, depending on her major). So far we have studied three such generic measures, those designed for Communications, Valuing, and Social Interaction.

Our study of the Communications generic instrument indicates that it validly discriminates instructed from uninstructed performance as does the Valuing generic instrument. Weekday students performed better after two years in the learning process in speaking, writing, listening and reading criteria than Weekend entering students. On level 4 of the Valuing process, Weekday students performed better after two years of instruction than did Weekend entering students (Friedman, Mentkowski, Earley, Loacker & Diez, 1980). More important, patterns of student performance validate the sequential levels of Communications. The cumulative sequence of levels 1, 2, 3 and 4 of Communications was confirmed for instructed students; Weekend entering students used a different sequence. For Valuing levels 1, 2, 3 and 4, levels 2 and 3 were found to be similar in complexity for students. For the Social Interaction generic instrument, we again have had more difficulty demonstrating that instructed students perform at higher levels than uninstructed students. We did find that instructed students interpret social interaction skills differently from uninstructed students, and maturity and motivation affect performance in a group discussion (Friedman, Mentkowski, Deutsch, Shovar & Allen, 1982).

Creating Strategies for Evaluating and Revising Instruments

These studies did lead us to try out a variety of strategies for validating these nontraditional assessment techniques. Some worked better than others, depending in part on how well the ability we are measuring is understood. Abilities like Social Interaction are new to higher education instruction, and we have a long way to go to adequately validate these kinds of measures. We have found that our older college population helps in this regard because we get a better picture of just what aspects develop through informal learning. And some quantitative strategies work better than others in showing differences between instructed and uninstructed students. In another series of studies with a range of sixteen other measures (Alverno College Assessment Committee/Office of Research and Evaluation, 1980), we found that criteria evaluation, establishing inter-rater reliability of assessor judgments and pre- and post-instruction comparisons were three strategies that functioned well and were accepted as workable by a range of faculty from different disciplines.

Consequently, three questions are now routinely asked by faculty designers of instruments: Are assessor criteria valid? Is assessor judgment reliable? Does the instrument measure the effects of instruction? Direct involvement of faculty in analyzing student performance data and probing validity questions continues to generate a broad scope of validity issues.

Expert Judgment is Reliable
Faculty-Designed Measures Are Valid

In sum, the faculty demonstrate high reliability as expert judges of student performance. We will continue to study the generic ability instruments, as well as the Integrated Competence Seminar and the Six Performance Characteristics Rating, since they seem to function effectively as the college's own external criterion measures. This is more feasible than attempting validation on each of the hundreds of in-class instruments, which are frequently revised and which are often short-lived, and may offer intervals for student change no longer than a single semester. Other examples of milestone measures are narrative transcripts, standardized subject area tests, state boards for nursing, senior projects and the generic measures per competence or discipline. If the faculty's own milestone measures are reliable, they can use them confidently in the ongoing creation and redesign of their in-class assessments.

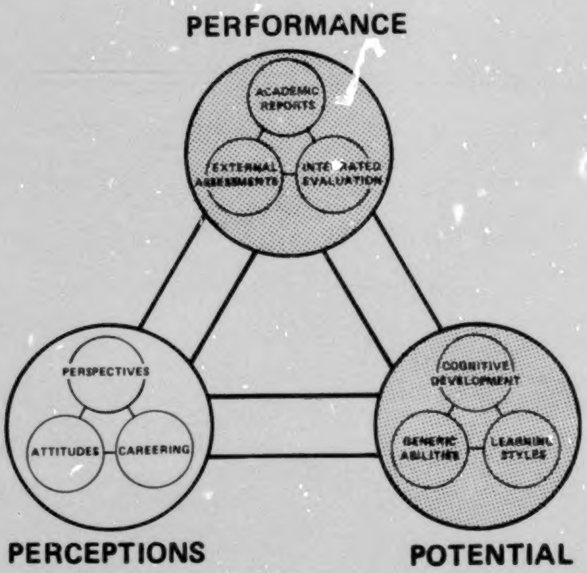
Student performance of abilities can be validly assessed and related to their performance in the curriculum. And we have also found that our understanding of an ability develops as we try to measure it. But do such changes also show up in student interviews of their perceptions of learning and on measures designed by theorists who describe human potential in broad growth patterns?

Students Change in Perceptions of Learning

Do students see themselves as making changes in performance that faculty assess and credential in the learning process? The major result from this source of data so far is that students do show consistent change during college in their perceptions and descriptions of learning. They also identify curricular elements that promote their learning. Of almost equal importance is the finding that students maintain a pattern across all four years of justifying learning in terms of its relevance to their career expectations. What changes is how they see the nature and role of learning within this stable framework; students do come to value liberal learning (Much & Mentkowski, 1982).

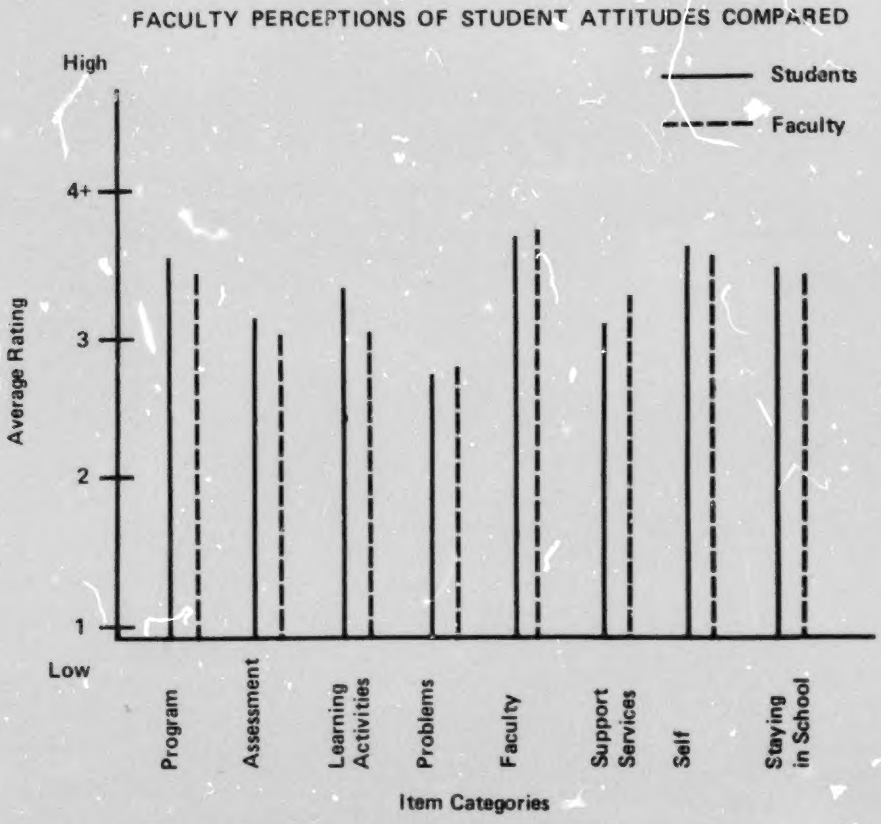
We believe educators need to develop a theory of ability-based learning that considers how students experience their education. How do students make meaning out of their learning? What cognitive, behavioral and affective constructions are agents of transfer of ability-based learning after college? How do students see their learning as relevant to their own goals and values? What elements of the curriculum affect development of abilities and "learning to learn," from the students' point of view?

STUDENT OUTCOMES


PERFORMANCE
ACADEMIC REPORTS
EXTERNAL ASSESSMENTS
INTEGRATED EVALUATION
PERCEPTIONS
PERSPECTIVES
ATTITUDES
CAREERING
POTENTIAL
COGNITIVE DEVELOPMENT
GENERIC ABILITIES
LEARNING STYLES

We did conduct a parallel longitudinal study of student attitudes toward the curriculum. Our first effort in this regard was to ask faculty to predict student attitudes (Mentkowski, 1977a, 1977b). In the spring of 1977, we representatively sampled and surveyed half the student body on their attitudes toward the Program, Assessment, Learning Activities, whether they indeed had a negative attitude toward Problems some students had identified in the curriculum, attitudes toward Faculty, Support Services, toward the Self, and toward Staying in College.

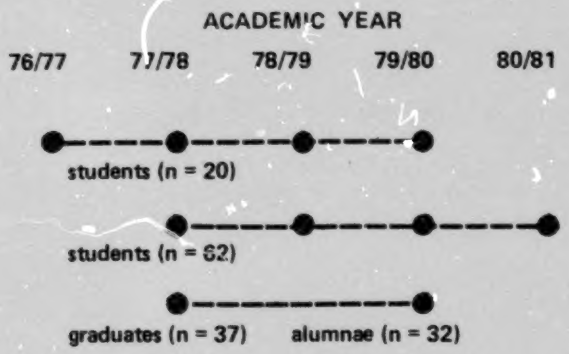
Concurrently, we asked each faculty member to complete the survey in the way that he or she thought the modal student would respond to each item. Thus, faculty were asked to predict how students would respond. The following graphic illustrates some of the results.



In all but one of the instances, there were no statistically significant differences between the actual attitudes of the students and the faculty expectations. In one case there was a difference. Faculty underestimated the strength of students' positive attitudes toward Learning Activities. In sum, faculty perceptions of student attitudes were on target. But we wanted to go beyond whether students liked or disliked aspects of the curriculum to their underlying perspectives on learning.

We now turn to the interviews of student perspectives. We gathered the student perception data through a confidential, open-ended interview format ranging up to two hours in length, guided by a protocol of questions and probes. The interview itself, the protocols, and a method for analysis were developed as part of this project (Mentkowski & Much, 1980b). Because this measure is lengthy and complex, both to administer and to analyze, we selected samples for interviewing from both the longitudinal and cross-sectional study populations. The results here reflect over 320 interviews from 82 students who provided interviews at one year intervals at the end of each year in college. These students also completed the external measures three times during this period, as did another 37 who were interviewed as seniors and as two year alumnae. At the end of college, students in the longitudinal sample were asked to complete a questionnaire on their careering expectations and goals (Mentkowski, Much & Giencke-Holl, 1983), to measure perceptions of careering.

PERCEPTIONS: LONGITUDINAL PERSPECTIVES INTERVIEW DESIGN



In all, almost 400 interviews were collected and transcribed. Interviews from traditional-age students, and those from alumnae, have been analyzed so far.

Students Become Self-Sustaining Learners

The interview analysis found that learning as described by students is a process of experiencing, reflecting, forming new concepts, and testing one's judgment and abilities in action. Two aspects of learning that students describe seem to be more characteristic of a traditional liberal arts education. Students are taught to be objective, to stand back and reflect on their experience. They are also consistently exposed to opportunities to form new concepts, to complete readings and attend lectures on theory. Students also came to realize that hands on experience is critical to learning. They also avowed that using new knowledge is necessary to really learning it and that one must test new found skills. From the student's perspective, these elements fit together as a process of learning that describes how they learn.

LEARNING IS:

a process of experiencing

reflecting

forming new concepts

testing one's judgment and abilities in action

Andrea describes this process (student names are fictitious):

> By learning something and going and applying it you can find out what worked for you, what didn't, what you really don't understand, and then you can go back and question. Or in learning new theory, you can apply, you can think back to the clients you have had or the situations you were in and say, 'If I would have known that then, it could have helped me a lot.' So I think the application and then going back to theory and questioning, helps make it more solid in your mind, you can understand it better.

The interview analysis further identified three major components that describe the development of this process of "learning to learn." They include taking responsibility for learning, making relationships among abilities and their use, and using different ways of learning.

STUDENTS DEVELOP "LEARNING TO LEARN" IN COLLEGE BY

taking responsibility for learning

making relationships among abilities and their application

using different ways of learning

For example, three students, Blair, Gwen and Julia, describe the second element, making relationships among abilities and their use.

Blair

> When I first came I thought learning would be taking a book, reading it, studying it, and doing well on a test. Now I realize it's understanding it and putting it in my own words, and relating it to other aspects. They want us to relate things, to pull everything together and to understand it

more. So now when I go to study, I say, "Well, this isn't just chemistry, it's related to everything else."

Gwen

Things are pulled together more for you through the competences, things pull together more than before. You might be taking a math class here, a music class there and they really have nothing to do with each other. But if you think about it (like you are doing problem solving in math and you're doing problem solving in music theory) it's really the same process. You don't really experience that unless you can go to your abilities and see that it really is the same thing. It's more interrelated and you can pull it together more for yourself.

Julia

You have to take these abilities, like valuing, in different classes. So I looked at valuing from the philosophical, psychological standpoint in a death and dying course. But I also looked at valuing in a biochem course, and in an art course. So it has caused me to take things and see them from many different points of view and that's challenging. To try to get values out of a biochem experiment, that's challenging. Looking for relationships in a lot of things and looking for universality where there seems to be none is really hard on your head, it really is.

Students Identified Curricular Elements Most Important to Their Learning

To what curricular elements do students attribute "learning to learn?" The next illustration shows the learning outcomes linked to elements in the curriculum that students identify as causing their development of learning to learn skills.

STUDENT ATTRIBUTED CAUSE		STUDENT OUTCOME
instructor attention, empathy feedback, self-assessment	→	taking responsibility for learning
experiential validation instructor coaching professional application integration of abilities	→	making relationships among abilities and their use
practice, feedback modeling, peer learning	→	using different ways of learning

One of the more prominent causes gleaned from the interview examples is experiential validation, having to apply abilities within and across courses, demonstrating them on assessments and during internships, using the abilities in multiple settings. Roxanne, Lindsey and Alyson describe this process below.

> Roxanne
>
> I know for sure that I learned my anatomy down pat because of the chance they gave me to go into the lab and touch the stuff, even if it was a rat's corpse or whatever. I got in there and experienced it and that's one part of the learning. But when you have this on-the-job experience, I learned because I have to use the knowledge that I have. So when you use it then you start to internalize it.
>
> Lindsey
>
> I think I learn better when I'm actually doing something--and then getting criticized on it--getting feedback on it. The way most of the faculty structure their courses, they give you lecture and experience so you can see what you've learned in class is really working. The internship program is very good for me. You take all that you've learned in your college years when you get out there in a job placement, and you see that you've really been learning in school because you can use it out there. That what you've done did sink in, what the teachers have been trying to teach you. And it's not just memorizing. It's something you can actually work with. It's the experiences they give you that have shown me that I've really learned.
>
> Alyson
>
> They've challenged me to use all my skills on the spot. I've been encouraged here to learn all about the situation before making a decision. And so I assess situations more thoroughly in my personal life and at work before I act. Just because here they make me so conscious of that sort of thing, of observing, of assessing, evaluating the nature of something, putting the pieces together. They keep reminding me of that when I get in a situation. I can't just put that behind me, that's a part of me now. I go around with my eyes more wide open, I think.

Students also consistently broaden the settings in which they describe themselves using their abilities. As they progress, they cite instances from work, family and other environments as often as their in-class assessments. This indicates that they have cognitively made the transfer which they claim to have made experientially.

Other causes included two variables more likely to be found at small colleges: instructor attention, empathy and instructor coaching. But the other student attributed causes--experiential validation, feedback, self-assessment, practice, professional application, opportunities to integrate abilities, modeling and peer learning--are curricular elements that already are, or could be, used at larger colleges and universities.

Students Came to Value Liberal Learning

Do students oriented toward vocation and career develop liberal learning values? Alverno students do develop values for openmindedness, dealing with multiple points of view, and appreciation for the arts and humanistic traditions. A large share of students come to college today to have a better chance at a job and career, in contrast to values for personal growth or learning for its own sake (Astin, 1983). Alverno students are no exception. A major result from our study of perceptions is that students do maintain a consistent pattern across all four years of justifying learning in terms of its relation to their career expectations. Liberal learning values become attached to career and professional values, which also become elaborated.

From the outset, students view learning in terms of their career goals. Traditional-age students are critical of many kinds of learning on this score at first. As they progress, however, students consistently develop the ability to assimilate widely varying courses into their rationales.

By the second interview, for example, they argue that courses in "non-major" areas and abilities like valuing and aesthetic response "help me to stay open-minded" or "give me a broader view of things and people." Such descriptions are in turn justified by explanations: "I know that as a manager I'll have to deal with people from all kinds of backgrounds and help them work well together," or "When you deal with (nursing) clients, you've got to understand their viewpoint and their values and feelings . . . that's part of your diagnosis."

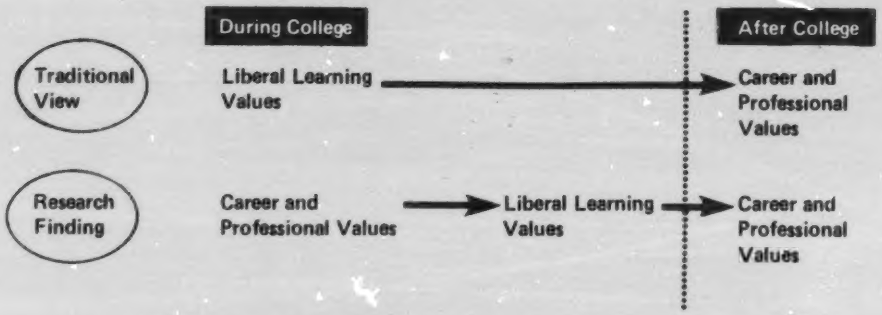
What is significant here is, first, the repeated pattern of change from skepticism to assertions of value for "liberal education" experiences, on the part of students who remain primarily career-focused. Second, the pattern includes not simply assertions, which might only be environmentally acceptable noises. Students make relationships between their concepts of learning and their learning experiences, and give concrete explanations of how they see these kinds of learning as valuable to their careers, and to their personal life experiences.

Closely allied to this pattern is the consistent importance of competence, or demonstrated ability, in the student's ongoing enterprise of preparing herself for career role performance. The fact that the faculty have explicitly identified abilities within their disciplinary subject areas, and have linked them to career role performance, seems clearly to provide students with the "missing pieces" to link classroom and workplace in their own cognitive structures.

At least as important, however, is the steady increase in students' descriptions of feeling increased mastery, control, and certainty. This seems to relate--as they themselves repeatedly avow--to their steadily accumulating experience of not only identifying but actually being able to demonstrate these career-valuable abilities. The areas of Communications and Social Interaction are earliest and most frequently cited, perhaps since they involve areas that are particularly problematic for the young student just entering the college environment.

Students also consistently broaden the settings in which they describe themselves using their abilities. As they progress, they cite instances from work, family and other environments as often as their in-class assessments. This indicates that cognitively they have made the transfer which they claim to have made experientially. Through experiential validation of the competences, students are able to construct a justification for liberal learning in which personal growth and effectiveness mediate between educational experience and concepts of professional role performance.

Experiential validation, described earlier, is a key factor in the student's justification of liberal learning as relevant for her personal life and career. The ability-based curriculum has value for them because they find they can immediately apply the abilities in other classes, and in their interpersonal relationships with friends and family, and in part-time or full-time work.



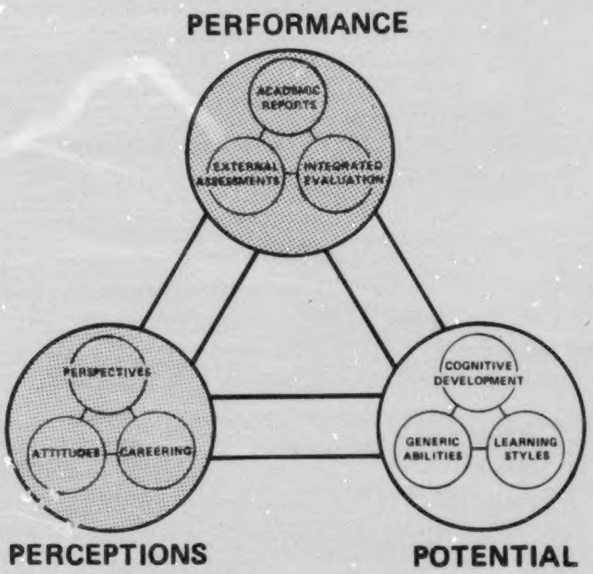
Traditional views of college assumed that students enrolled to develop liberal learning values, which were expected to link to career and professional values when students entered the work force after graduation. Our results indicate that students come to college seeking job and career security. Liberal learning values become attached to these early values. Concerns for economic security develop into career and professional values, a linking that is reinforced and enriched by the new liberal learning values.

Student Changes in Human Potential

Almost all colleges promise personal growth outcomes and expect that college makes a difference in broad abilities, lifelong learning and life span development. Studies of college outcomes have shown that college as a whole causes change (Astin, 1977; Feldman & Newcomb, 1969; Heath, 1977; Jacob, 1957; Pace, 1979). Few studies have demonstrated change linked to a particular curriculum. Yet it is more and more critical that the curriculum rather than the college atmosphere alone be responsible for change. Educators are hampered in their efforts at curriculum reform if they do not know how the curriculum is, and is not, effective. Also, a larger share of younger students work, and spend less time in extracurricular activities and/or do not live on campus. Do they achieve personal growth outcomes? And does a liberal arts college also committed to its students' professional development, contribute to the development of their overall human potential?

Many colleges enroll large numbers of older students. Does the curriculum we offer build on adults' more elaborated experiences? Are adult changes merely a function of greater maturity rather than the curriculum? Do younger students develop in a college also focused on the growth of older adults? Questions that guided our research are: (1) Do students change on instruments drawn from outside the college, that measure human potential for learning, abilities and life span development? (2) Can we attribute change on these measures to student performance in the curriculum? What is the "value added" to student development by the learning process? (3) Does the mature adult need education or is experience enough? What are the relative effects of age and performance in the curriculum on growth?

Thus, alongside (a) student performance within the curriculum on Alverno-designed ability measures, and (b) the study of student perceptions, we also researched (c) student performance on twelve measures drawn from outside the college describing human growth patterns from three separate theoretical frameworks: cognitive developmental theory (Kohlberg, 1981b; Loevinger, 1976; Perry, 1970; Piaget, 1972; Rest, 1979a), experiential learning theory and learning styles (Kolb, 1983), and a recent thrust to identify and measure generic abilities that link education to performance after college (Watson & Glaser, 1964; Winter, McClelland & Stewart, 1981). Because we can relate variations in performance on Alverno-designed measures to longitudinal change on these outside measures of human potential, we can examine whether performance in the ability-based curriculum contributes to change in human growth. Because research participants range in age from 17-55, we can examine the relative effects of age and performance in the curriculum on growth as well.


STUDENT OUTCOMES

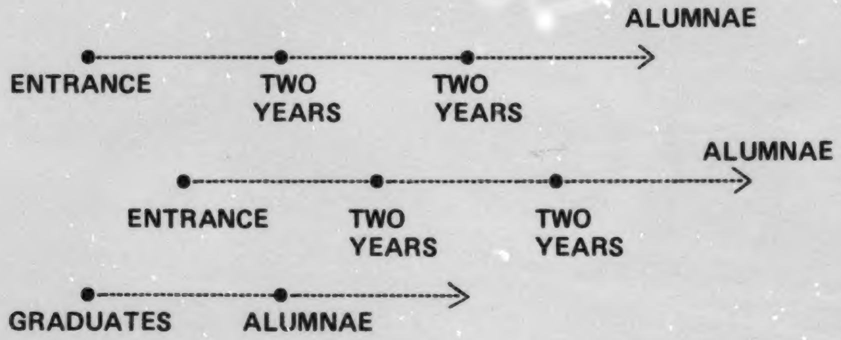
PERFORMANCE
ACADEMIC REPORTS
EXTERNAL ASSESSMENTS
INTEGRATED EVALUATION
PERCEPTIONS
PERSPECTIVES
ATTITUDES
CAREERING
POTENTIAL
COGNITIVE DEVELOPMENT
GENERIC ABILITIES
LEARNING STYLES

First, a word about our choice of measures. One problem in measuring college outcomes is that most existing measures are unrelated to liberal arts goals. It has not proved possible to locate measures developed outside the college which are readily congruent with all or even most of the complex major abilities that educators identify as outcomes of college. The preponderance of available measures focus in the cognitive area, from broad developmental measures to instruments aimed at particular analytic thought processes. We have not been able to approach our design ideal of several external measures overlapping on faculty-designed abilities or outcomes. For example, measures like the Scholastic Aptitude Test (SAT) or Graduate Record Exam (GRE) measure content areas, comprehension and memory, but do not measure abilities like critical thinking or valuing.

Another problem in measuring college outcomes is that most existing instruments also tend to be recognition rather than production oriented. Recognition measures tap lower level learning outcomes like awareness, but not the ability to generate a response in a complex essay or group discussion. Thus, we have had to make special efforts to be able to use performance oriented instruments in fairly early stages of their development (Mentkowski, Moeser & Strait, 1983). While recognition instruments are generally more responsive change indicators, and more economical to handle, our focus on the complex, active abilities and outcomes that colleges intend to foster has given us a special commitment to collaborating with colleagues in the emerging field of performance assessment.

Now a word about measuring change, and a short recap on the design and data base. Still another problem in measuring college outcomes is distinguishing change effects from the effects of initial selection, maturation, attrition, retesting and societal change. To this end, we incorporated both longitudinal and cross-sectional designs.

HUMAN POTENTIAL MEASURES: LONGITUDINAL DESIGN



The twelve human potential measures were administered to two complete entering classes and one graduating class (altogether about 750 students). The entering classes completed the same battery two years after entrance, and again two years later near graduation. Thus, we have a set of longitudinal results which can be double-checked against results from a cross-sectional study of 60 graduating seniors compared with entering students who later graduated (controlling for retesting and attrition with initial selection factors such as disposition to change probably uncontrolled). The data on 200 of the students who completed the twelve instruments on three occasions provides a parallel stream of longitudinal information alongside these same students' progressive performances on five college-designed measures. These twelve instruments plus the five measures of student performance in the curriculum, yielded 17,500 responses. This extensive data base was gathered to enable large longitudinal sample sizes, and to increase educators' confidence in the results.

The design includes two age cohorts (17-19 and 20-55 at entrance) to examine the effects of maturation, and two achievement cohorts (high and low based on number of consecutive assessments completed in the learning process) to examine the effects of performance in the curriculum. Two class cohorts, with the second cohort further analyzed for Weekday versus Weekend time frames, further enhance representativeness, although only further longitudinal cohorts could truly control for societal change effects. The time series design holds time constant and allows performance in the curriculum to vary, so we can attribute change to performance in the curriculum in the absence of a control group of students who did not attend Alverno. We also control for the following age, background and program variables as well as pretest scores when we study the effects of performance in the learning process. What did we find?

VARIABLES CONTROLLED IN THE LONGITUDINAL STUDY OF STUDENT CHANGE

BACKGROUND

- *Age
- Religion
- Mother's Education
- Mother's Occupation
- Father's Education
- Father's Occupation
- *High School Grade Point Average
- *Prior College Experience
- *Marital Status

PROGRAM

- Entering Cohort
- Residence
  (Dorm/Commuter)
- Student Status
  (Part time/Full time)
- Major

PRETEST SCORES

* Variable related to some scores at entrance to college

Generally, Student Change is Related to Performance in the Curriculum

Students clearly show significant developmental changes across all three occasions when the battery of twelve measures has been administered (Mentkowski & Strait, 1983). Generally, the change that occurs can be related to student performance in the curriculum. This is the case even when we account for change due to the pretest scores, age, religion, parent's education and occupation, high school grade point average, prior college experience, marital status, year of entrance, living at home or on campus, full or part time attendance, and type of major.

Looking at the results of all the external instruments together, we find first, that students appear to change more on these external measures in the first two years than in the second two years. But the changes in the second interval are more directly attributable to the student's successful participation in the college's curriculum. This finding suggests that there may indeed be a college atmosphere effect, as studies of college outcomes have shown. But the curriculum does have a decided, added value as well.

Older and Younger Students Changed

Among the other variables that could account for change, the age of the student may be particularly significant for educators attempting to serve the "new" student effectively. Older adults change because of the curriculum just as younger students do. Our noteworthy finding here is that age does indeed seem to confer some initial advantages as reflected in the cognitive-developmental scores of entering students, but not on the more specifically focused generic abilities. This suggests that educators can rely on age as an indicator of advanced ability with respect to broad cognitive patterns but not at the more specific level. More important, older students change. Their accomplishments reflect more than a paper qualification.

Students Synthesized Intellectual and Interpersonal Abilities

In looking for interrelationships among the cognitive-developmental patterns, learning styles and generic abilities we measured, we have found an unanticipated but valuable result. When students entered college, and again two years later, student's performances on the battery of twelve measures tended to statistically cluster around two separate developmental factors--one we call logical or analytic thought, and the other we call socio-emotional maturity or interpersonal ability. But after four years in college, the two clusters had merged. This may reflect one of the most desired outcomes of college, namely, that students are integrating their own understanding and use of these two kinds of abilities.

Students Showed More Change on Recognition Measures Than on Production Measures

We expect that measures that call for recognizing concepts require a less sophisticated level of understanding than measures demanding that a student produce the concept. Recognition measures (ranking statements, multiple choice) should show more change; production measures (essay, set of stories) should show less. Indeed, the recognition measures in general show more change across four years than do the production measures, but in the second two-year interval, the trends of that pattern began to reverse. This supports a recent trend to develop measures of college outcomes which ask students to generate abilities rather than to recognize or comprehend knowledge. After all, these kind of production measures are used by faculty to assess advanced level work in a student's major. The cognitive-developmental measures and the one motivational measure also gave more indications of student change than did those focused more specifically on particular abilities or processes. Our expectation is that the comparatively smaller indications of change on production measures will loom larger in relation to long term effects concerning careering or future learning.

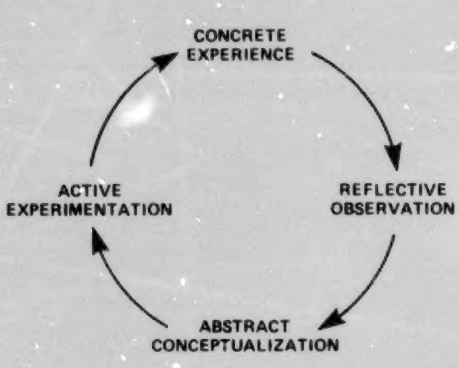
Students Changed on Broad Generic Abilities

These general findings come to life as we examine the multiple patterns of student change that emerge from our look at students' developing abilities. Combined results from the longitudinal and cross-sectionl studies using McBer's Cognitive Competence Assessment Battery (Winter, McClelland & Stewart, 1981), and a more traditional critical thinking measure (Watson & Glaser, 1964), show changes on the broad, generic ability measures of critical thinking, achievement and leadership motivation, self-definition and personal maturity. Thus, our more conservative, variable-controlled comparisons confirmed results from a separate seven college study of student change in relation to college-promised goals in which we participated as "Clare" College (Winter, McClelland & Stewart, 1981). This also supports the recent trend in higher education calling for production measures of college outcomes which ask students to generate essays or respond in simulations rather than to select from a list of alternatives.

The need for more research on college outcomes measures is further underscored when we compare results on student change from this set of generic ability instruments with those from the other external measures. There is more change on the cognitive-developmental and learning style measures. Also, more of the existing change can be directly related to student performance in the curriculum. Why this is the case is not clear. What is clear is that our interpretations must rest on observations of which instruments show what kind of change in relation to instrument purposes and relationships. Colleges are in need of valid production measures of broad abilities, and studies like this one can contribute to this common purpose.

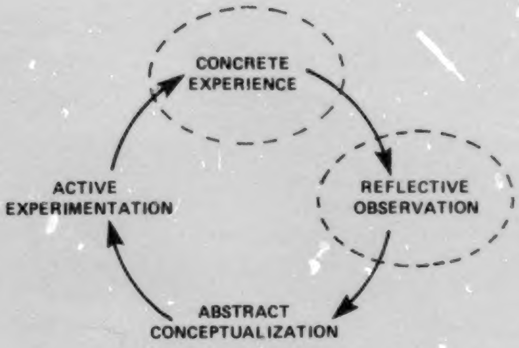
Student Learning Styles Changed Dramatically

Our student interviews independently confirmed a recent description of the learning process as experiencing, reflecting, forming new concepts, and testing one's judgment and abilities in action (Doherty, Mentkowski, & Conrad, 1978; Kolb, 1983).

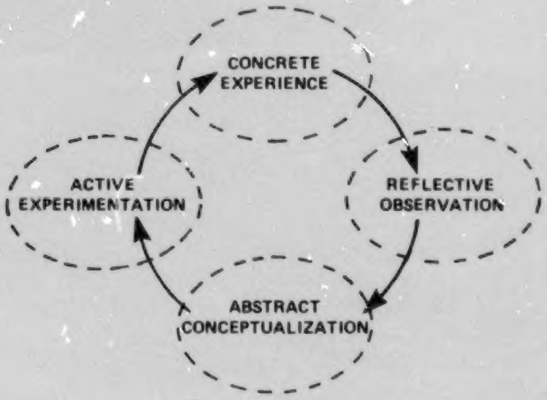


Kolb derived this experiential learning theory from theories by Lewin, Dewey and Piaget and has researched it in part through measures of learning style.

Further evidence for the Alverno student's growing awareness of learning processes are the dramatic changes appearing in students' orientations to learning styles, using Kolb's measure. At entrance, both younger and older students showed marked preference for "concrete experience" over "abstract conceptualizing," and for "reflective observing" as against "active experimenting."


CONCRETE EXPERIENCE
REFLECTIVE OBSERVATION
ABSTRACT CONCEPTUALIZATION
ACTIVE EXPERIMENTATION

In the first two years, they moved rapidly toward a more balanced pattern: by the second testing, they had come to rely equally on concrete and abstract modes and to show a similar flexibility in choosing either reflective or active approaches.


CONCRETE EXPERIENCE
ACTIVE EXPERIMENTATION
REFLECTIVE OBSERVATION
ABSTRACT CONCEPTUALIZATION

Additional analyses revealed that students who showed high achievement in the curriculum changed more, and that the curriculum still accounted for change where age, pretest scores and the other variables were controlled. Overall, achievement in the curriculum had more of an effect on changes in learning style preferences than did age.

We find that the growth toward balance among learning modes occurs for both younger and older students, although there are some differences. Age seems to have more of an impact on the concrete/abstract dimension; older students are more likely to prefer concrete experience as a learning style at entrance to college than are younger students. And younger students seem to more easily include abstract conceptualizing during the first two years of college than older students, perhaps because of their more recent high school learning experiences. But older students who are high performers in the curriculum continue to increase their preference for abstract conceptualizing during the second half of college. Age is not correlated with the reflective/active dimension at entrance. But older students appear to more easily include active experimenting than younger ones, probably because their more immediate and long term involvement in work and family concerns calls for more active trial of their ideas and plans (Mentkowski, O'Brien, Cleve & Wutzdorff, 1983).

Students are, after all, expected to become more versatile and habitual abstract thinkers, and they should also be actively involved in their world as well as reflect on it. We find that this balance among learning modes, which appears so dramatically in two years' time, maintains itself after entry into a concentrated, career-oriented major.

Students Developed Moral Sophistication

The study of student perceptions indicated more sophisticated changes in valuing, also confirmed through faculty experience (Earley, Mentkowski & Schafer, 1980). These changes parallel similar development in moral reasoning measured by Rest's Defining Issues Test. Students became increasingly sophisticated in their use of principled reasoning in resolving moral dilemmas. Older students showed generally higher scores than younger students at entrance to college, but both groups made gains during college, with high achievers in the curriculum showing more change than low achievers. These curriculum effects were maintained when age and the other variables were controlled.

These results were less strongly realized on the production measure of moral judgment, Kohlberg's written Moral Judgment Interview. Graduating students showed gains over entering students in the cross-sectional study, but age was the statistically significant covariate. In the longitudinal study, change occurred during the second half of college. Results suggest that development shows first on recognition measures and later and less strongly on the production measures. This supports the general finding that change is gradual on production measures of life span growth.

On Loevinger's levels of ego development, cross-sectional results showed that students entered college in transition between the Conformist and Conscientious levels. Students graduated at the Conscientious level or at the transition to the Autonomous level. Longitudinal results showed no change. Students made gains in the extent to which they demonstrated Piaget's conception of the logical reasoning and analytical thinking structures characteristic of adults. These results appeared in the longitudinal study but not in the cross-sectional comparison.

Younger and Older Students
Changed Their Ways of Thinking

Themes and Patterns of Change

A major goal in researching student outcomes was not only to pinpoint curriculum effectiveness, but also to better understand the nature of the abilities and how they are developed. Studies of alumnae and student interviews helped us describe a theory of learning that was based more firmly on student and alumnae experience. The study of student performance on outside measures of human potential help us examine the nature of change itself, its themes and patterns. This is particularly important as we embrace the adult learner and begin to develop curricula that consider the patterns and pathways of human growth. As stated earlier, we found that students change more on these external measures in the first two years than in the second two years. But the changes in the second interval are more directly attributable to the student's successful participation in the college's curriculum.

Change is Gradual on Production Measures of Life-Span Growth

We also found that recognition measures show more change than do production measures. Students were asked to generate or produce their own essays or other self-generated responses on measures based on or created by the major developmental theorists (Piaget, Kohlberg, Loevinger, Perry). While change occurred, both younger and older student groups changed approximately one to two stages or positions in four years. We conclude that stage theories of adult development are illuminative for understanding student perspectives in classroom interaction and on assessments, but that these theoretical descriptions alone cannot serve as the cornerstone for curriculum development or for assessment. Faculty-designed ability measures are critical for monitoring change in ability development on a day to day and week to week basis. Clearly, however, a college needs a concentrated effort across the curriculum from the faculty, as well as student services. If multiple influences on growth are planned for across the curriculum, these gradual changes in adult development are likely to occur over time.

Students Changed on the Perry Scheme of Intellectual and Ethical Development

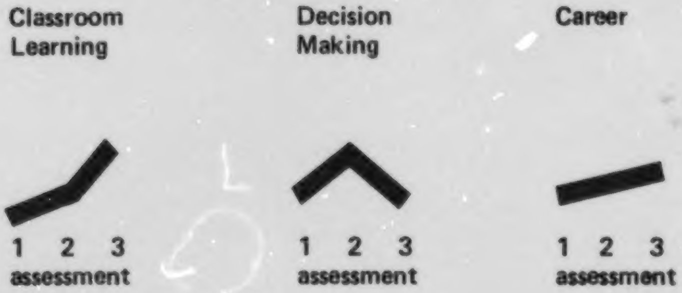
At the same time, it is important to note that mature adults make changes because of the curriculum just as younger students do. But we also found that there were differences in when this change occurred on some measures.

Perhaps the cognitive-developmental model most directly descriptive of college students and of primary interest here in describing non-linear change is Perry's scheme of intellectual and ethical development, which is drawn from interview studies of Harvard undergraduates. This scheme describes phases through which students move as they respond to the diversity and ambiguity encountered in college learning. The following illustration gives but a brief glimpse of how the student conceptualizes learning according to the Perry scheme. The more elaborated and complex model in Perry (1970), and the criteria explicating each position in Mentkowski, Moeser and Strait (1983), describe a much more elaborated picture of intellectual development.

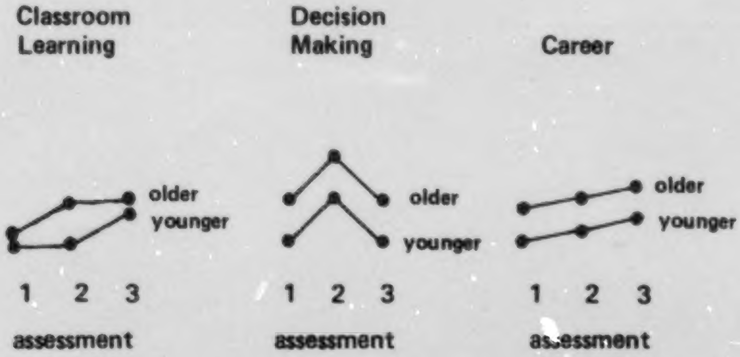
DUALISM	MULTIPLICITY	RELATIVISM		COMMITMENT
WHAT TO LEARN	HOW TO LEARN	HOW TO THINK	THINKING IN CONTEXT	

Our own intensive study of 3,000 essays from 750 students first demanded that we develop a valid method and sets of criteria for using expert judgment (Mentkowski, Moeser & Strait, 1983) to code essays (elicited by Knefelkamp and Widick's Measure of Intellectual Development). We studied three areas of development in relation to the Perry scheme: classroom learning, decision-making and career. Students wrote an essay in each of these areas and it was rated for Perry's scheme using our tested method and criteria. We found that the measure shows definite student change in both cross-sectional and longitudinal studies.

Students show less change in understanding learning processes and roles during the first two years of college and more change during the last two. Students use more sophisticated modes of decision-making after the first two years of college, but after the second two years, students show a sharp decrease in level of sophistication in decision-making. Probably when they are assessed near graduation, they are making decisions in areas related to future issues, and begin by using less complex modes of thinking. Change on careering is upward and gradual, although this pattern is statistically significant only in the cross-sectional study. The following illustrations of these patterns summarize a combination of results from Mentkowski and Strait (1983).



Other patterns emerge when we compare older and younger students. Older students have a consistent edge on younger students in decision-making and career understanding at entrance. And although both groups change, older students maintain their increased sophistication.

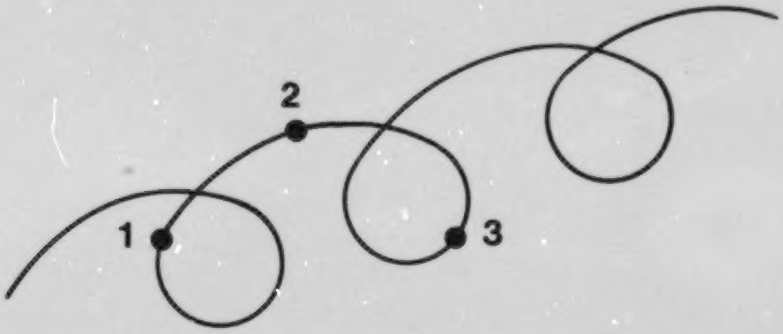


But understanding of classroom learning processes and roles is not related to age at entrance to college. Older students are starting at the same place as younger students when they enter. But after two years, older students make more immediate progress in understanding such concepts as learning in multiple ways, learning from peers, and becoming independent in their own learning. But younger students do "catch up" during the last two years, when they make their leap in development. Formal learning experiences are necessary for this enhanced understanding of classroom learning processes and roles. Change for both older and younger students is due in part to performance in the curriculum.

How does high school grade point average, a commonly used predictor for success in college, relate to these patterns of learning? Student change on any of the three areas of development is not related to high school grade average when students enter college, nor does high school average account for change during college. Apparently we are describing different aspects of intellectual development than are measured by more traditional indicators of success in college. After all, grade point average in high school is a commonly used predictor for grade point average in college. But learning to become a learner, as measured by the essay on classroom learning, rated relative to the Perry scheme, appears to be tapping quite different, more basic structures of thinking. These structures, over long periods of time, do change as the result of college learning experiences. Perhaps it is these new understandings that account for students' learning to learn, and we need to concentrate on this to develop lifelong learners.

Change is Not Linear; Both Younger and Older Students Showed Recycling

But what explains these variations in growth? Patterns of change do not run neatly in parallel. There are increases at some intervals as well as some decreases. Our reading of the evidence on this and other measures suggests that development is not linear, and that both younger and older students show recycling. That is, development proceeds in a gradual upward movement, but when an individual enters a new discipline, setting or life phase, she cycles back to earlier, less sophisticated modes and strategies of thinking. This may explain why we see an increase in decision-making ability on the Perry scheme during the first two years, and a decrease after the second two years, when students are generally faced with the more unfamiliar decisions that leaving college brings. This recycling is described in the following illustration. It shows gradual upward movement, with recycling. The three points of assessment show that we might see increases and decreases on measures, depending on when in the cycle we "catch" student thinking.



This pattern does seem to suggest the kind of complex developmental movement noticed by Piaget, in which a learner may revert to employing an earlier cognitive strategy when coping with new challenges, entering a new phase of growth, or focusing on a different ability. It will take considerable further study before we can say that these results document this phenomenon of decalage. But the possibility that we might validly record such developmental complexity is a promising one, particularly because our criteria and method enable us to measure the evolution of change, as well as stability in cognitive level or position (Mentkowski, Moeser & Strait, 1983).

Educators cannot assume that sophisticated levels of student thinking in one area are necessarily parallel in an unfamiliar area. Thus, even experienced adults can expect benefits from formal education. These findings argue for multiple, systematic assessment of abilities across disciplines to verify ability development and improve prospects for transfer to other settings. Indeed, high performers in the curriculum decreased less on decision-making as measured by the Perry scheme than low achievers performers did the second two years of college.

Using Abilities is Learned

Traditional liberal arts curricula have emphasized development of cognitive abilities over performance. Ability-based learning demands using abilities across multiple settings. Results from all three data sources--students, alumnae and professionals--confirm that the performance of abilities is a developmental, learned process that needs systematic teaching and opportunity for practice. Increasingly complex performance develops in concert with gradually more sophisticated modes of thought.

Thus, application of abilities cannot be left to chance. Performing critical thinking on a term paper needs to be expanded to on-the-spot analysis of situations in the practice of one's discipline or profession. Student interview discussion of using abilities has led us to propose an "extension" of the descriptions of intellectual growth on the Perry scheme that incorporates this performance dimension. From an initial focus on "what to perform" ("Tell me what to do."), the student sees performance as a process and concentrates on various ways to do something--"how to perform." Students' next phase is to begin "thinking about performing," conceptualizing theories of action, which they test out in situations. Only then do students become capable of "performing in context"--adapting abilities through various performance strategies appropriate in and related to the setting or particular situation.

EXTENSIONS OF THE PERRY SCHEME

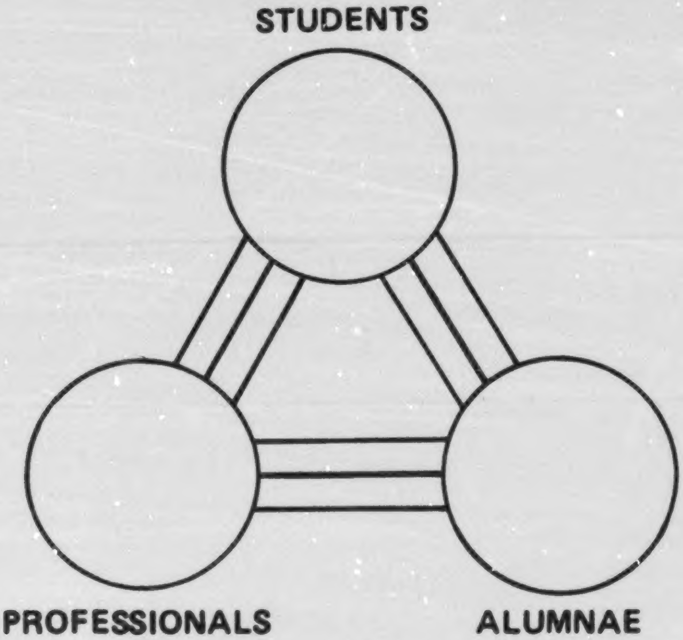
DUALISM	MULTIPLICITY	RELATIVISM		COMMITMENT
WHAT TO LEARN	HOW TO LEARN	HOW TO THINK	THINKING IN CONTEXT	
WHAT TO PERFORM	HOW TO PERFORM	THINKING ABOUT PERFORMING	PERFORMING IN CONTEXT	

Beginning COMMITMENT ——————————→ COMMITMENT

Student and alumnae interview data also confirm that student commitment to personal, career and professional values develop throughout college (illustrated by the arrow above). There is also an important performance dimension to commitment; students consistently give examples of how they are acting out of their personal and professional value systems. Similar to their understanding of learning, their understanding of their own commitment develops throughout college and they show more and more sophisticated behaviors that match their increasingly internalized goals and values.

HOW DO ALVERNO COLLEGE OUTCOMES RELATE TO THE WORLD OF WORK?

We used three approaches to examine the relationship between the outcomes shown by college students and the world of work. Three independent data sources result: (a) studies of student outcomes described in the previous section; (b) alumnae perceptions of the abilities involved in the workplace, and of the value of learning in their own evolving life goals (Mentkowski, Much & Giencke-Holl, 1983); and (c) studies of the abilities actually used by professionals in job situations (Mentkowski, DeBack, Bishop, Allen & Blanton, 1980; Mentkowski, O'Brien, McEachern & Fowler, 1983).



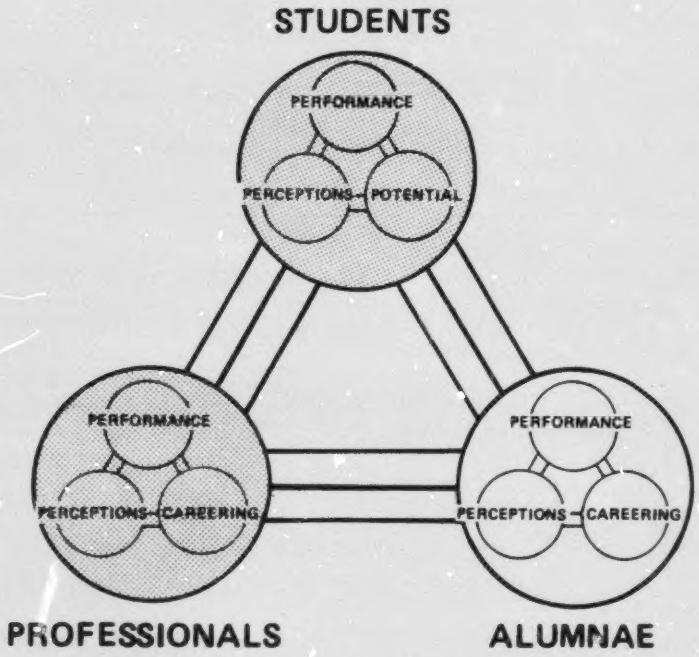
The data from alumnae, and other professionals who are not Alverno alumnae, suggest that graduates experience direct transferability into the workplace of intellectual and interpersonal abilities learned in college, and there are key abilities exercised by effective professionals which are statistically related to college learning and conceptually linked to the abilities identified and taught by Alverno faculty. Further, alumnae continue as self-sustaining learners, showing "learning to learn" skills that enable them to develop and adapt abilities, and to achieve job and career satisfactions.

Alumnae Realized Career Expectations

Graduates are highly successful in achieving their immediate career-oriented goals. Of the 1978 class, ninety-two percent were employed two years after graduation, a percent also achieved by the 1983 graduating group a year after college.

To enable a cross-sectional comparison of graduating senior expectations with alumnae realizations, all 63 two-year alumnae in the class of 1978 who graduated from the outcome-centered curriculum implemented in 1973 were surveyed in Spring, 1980. Fifty-six responded to the Alverno College Alumna Careering Questionnaire (Mentkowski & Bishop, 1980a), providing information on work and career history, expectations and satisfactions, continued education planned or achieved, and a variety of judgments about the value of college preparation for educational, personal and career goals.

A parallel form (Mentkowski & Bishop, 1981) simultaneously surveyed 63 of 68 graduating seniors from the first longitudinal cohort for similar information except they were asked to anticipate career satisfactions. Thirty-two of these two-year alumnae had been interviewed with the Student Perspectives Interview (Mentkowski & Much, 1980b) at graduation and were now invited for another in-depth two to three hour Alumna Perspectives Interview (Mentkowski & Much, 1980a), to assess their perceptions--and to infer performance. These 32 women also completed the careering questionnaire.



Graduating students almost uniformly expect to work after college. Ninety-six percent of the alumnae surveyed actually did seek employment upon getting their degrees. Of the 92 percent who were successful, 89 percent found positions directly related to their majors. Since our background data also indicate that these women are more likely to obtain professional positions than their mothers, education clearly seems to function for them as an effective route to professional careers. Graduating seniors had higher career expectations than alumnae were able to realize in two years, but alumnae rated aspects of satisfaction with their first positions and potential for advancement as above average. Alumnae also show a more positive attitude about their college learning after two years than seniors express at the time of their graduation, although both groups rated their college experience as above average on a majority of items (Mentkowski, Much & Giencke-Holl, 1983).

Both Intellectual and Interpersonal Abilities are Critical for Effective Work Performance

Given their generally positive attitudes toward college preparation, how did alumnae abilities carry over to performance? Faculty identified intellectual and interpersonal abilities for the new curriculum based on experience as educators and professionals, and on an analysis of academic disciplines and literature reviews. But would these same abilities form a basis for effective performance at work after college? Evidence from the two independent data sources shows that both intellectual and interpersonal abilities are critical for effective work performance.

Alumnae Stressed the Importance of Both Intellectual and Interpersonal Abilities

Of the 60 alumnae studied intensively as seniors who completed the questionnaire two years after graduation, over half were involved in two to three hour semi-structured, confidential interviews of their perceptions on work and learning. In analyzing the interviews, we found two major categories of complex abilities that were equally important in managing their work role and careers. Both younger and older women, across all professional groups, cited reasoning abilities--using such terms as "analysis," "problem solving," "decision-making," "planning" and "organizational abilities"--as important to their career performance. Alumnae also consistently emphasized interpersonal abilities learned in college as critical to effective work. The following are some alumnae examples of using intellectual abilities.

Clarice

When I think about how I learn now I realize that the first thing I always do is observe a given situation or problem. Then I try to say, "What is the whole and what are the parts, what's the relationship." Then I say to myself, "What do I need to do about it." So then I start in my problem solving steps. It is more and more becoming a permanent thinking mode for me. I know what the concepts are. I understand them. I know how to apply them. If your plan of action does not give you the end result, you can say to yourself, "I tried, I tested it and it didn't work. I will now see if I can try something else." It moves you along, you're not stuck at dead center. There is something very freeing about being able to think like this.

Megan

The thing about my job is that it's never the same. Another skill I probably should have mentioned, along with communicating, is analysis because you do work very independently. You have to take the specific individual cases, look at them, determine what is needed, what needs to be done, get financial statements or whatever from taxpayers, analyze them and try to determine a course of action . . . . So that in itself I guess is a learning experience because every case is different and you do have to use these skills over and over.

April

That year in my classroom, there was something major that went on every week. If it wasn't a problem with things missing, it was a problem with parents. I would come home at the end of each day or week and write down all the things that happened--just the bare facts. This is what happened, this is what I said, this is what they said. Then I would reread it and look at it and analyze what the real problem was--why things didn't go the way they should have or the way I would like them to. I would think about what I would do if a particular situation would come up next, and then I took action on it.

The following are some alumnae examples of using interpersonal abilities.

Rebecca

In interpersonal situations, in college and different sociology courses and the interpersonal skills classes and communications, you were given situations and always had time to read the materials for that particular course meeting. You had time to think of how you were going to handle a situation before you went in and conversed with your counterpart. You had anticipations of the outcome and those situations based on the knowledge that you had and the knowledge that your fellow classmates had. It's more immediate at work.

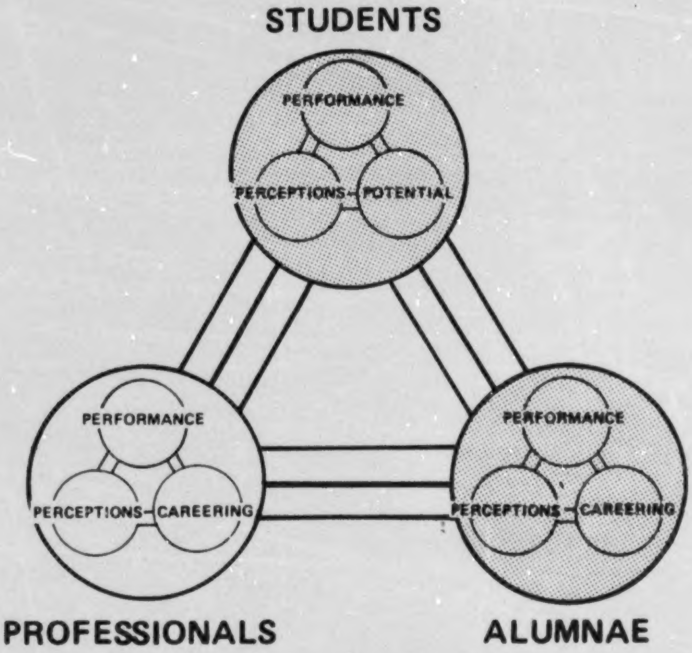
. . . During this last transition I was being tested. I must say, I had never ever experienced anything quite like this before . . . . There was just this whole trial period of seeing how far the people on the floor could push me, the hourly production workers and the supervisors. Because we're monitoring production . . . we have authority and responsibility. However, if a production person doesn't want to take care of a problem they don't do it. This is where this whole business of the interpersonal comes in. I remember one day where I held some pallets and the crew superintendent came up and he started screaming at me. He said, "Why are you holding these pallets . . . What is wrong with you, there's nothing wrong with this." This big harangue must have taken 15 minutes. He took my ticket I had written up and ripped it up in front of me. Power play, right? Well how do you deal with something like that? So I said something like, "Well . . . I hope you intend to rewrite those hold tickets." After this whole harangue he did rewrite those tickets. Later he said, "I have to congratulate you on how you handled yourself," because I remained cool, I didn't lose my temper, I remained reasonable. He said, "The last person I did that to, a woman of course, started to cry." He's constantly doing these things to find out how I'm going to respond under pressure.

Celeste

Social interaction, communication--not just standing behind and watching but opening your mouth when you have questions--those are abilities I use, definitely. At first I was afraid to ask doctors questions because I thought my questions were dumb, but I don't feel that anymore. If I have a question or if they wrote something I don't agree with, I'll speak up. I guess social interaction is the main thing, your communication skills primarily because you're more successful with your decision-making. I've been around too many nurses who don't open their mouths and I've seen the results of that, and people that speak up too much and the problems they've had.

Practicing Professionals Also Used Both Intellectual and Interpersonal Abilities

Our studies of effective professional performance were designed to build a bridge to professionals who were not Alverno alumnae in order to validate abilities the faculty had identified, and to create learning and assessment tools based on outstanding professionals' job performance. Eighty nurses from three health care settings (community, long-term care, acute care) and over 100 women managers and executives from 53 private corporations provided us with job performance interviews and careering histories. Perceptions were assessed through ratings of abilities critical to education, selection and performance.


STUDENTS
PERFORMANCE
PERCEPTIONS
POTENTIAL
PERFORMANCE
PERCEPTIONS
CAREERING
PROFESSIONALS
PERFORMANCE
PERCEPTIONS
CAREERING
ALUMNAE

Both studies yielded models of broad abilities that characterize effective on-the-job performance and showed a remarkable similarity to those identified by the faculty (Alverno College Nursing Faculty, 1979). The following illustration lists the nursing (Mentkowski, DeBack, Bishop, Allen & Blanton, 1980) and managerial competences (Mentkowski, O'Brien, McEachern & Fowler, 1983) in the order in which they were performed, from most often to least often.

Nursing Competences

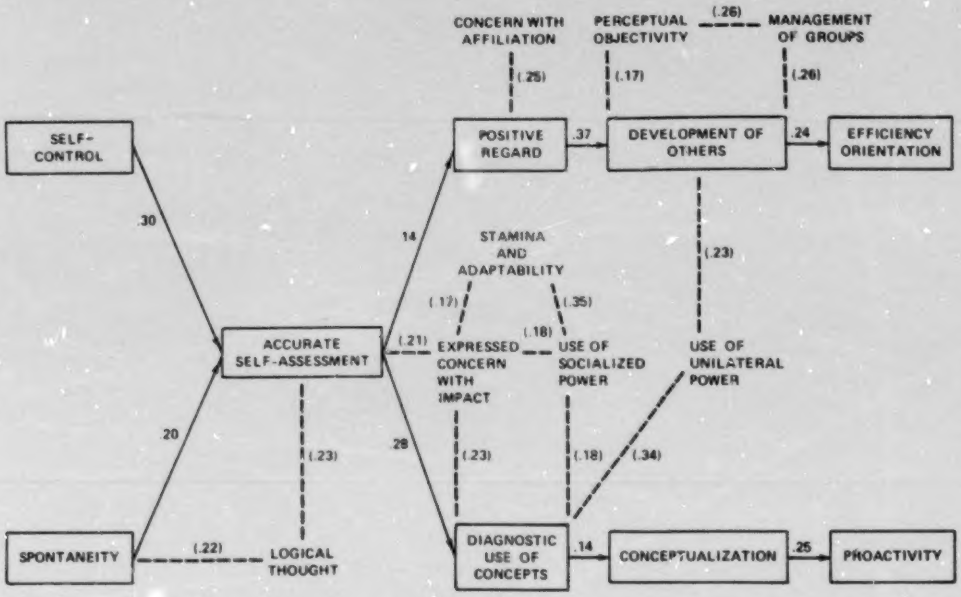
Helping
Influencing
Independence
Coaching
Conceptualizing
Ego Strength
Emotional Stamina
Reflective Thinking
Positive Expectations

Management Competences

Proactivity
Diagnostic Use of Concepts
Development of Others
Accurate Self-Assessment
Efficiency Orientation
Expressed Concern With Impact
Conceptualization
Self Presentation
Perceptual Objectivity
Oral Communication Skills
Use of Unilateral Power
Self-Control
Management of Groups
Positive Regard
Use of Socialized Power
Logical Thought
Stamina and Adaptability
Spontaneity
Specialized Knowledge
Concern With Affiliation

Intellectual and interpersonal abilities had equal importance in the ability models. Effective nurses used "coaching" to change client attitudes and behavior. In "conceptualizing," they created patterns of data, identified health problems, and gave rationales for treatment plans. Managers were equally likely to use intellectual abilities (thinking through problems, applying past experiences to interpret events, using a framework to guide analysis and actions) as they were to use interpersonal abilities (using power, developing subordinates, managing groups). To ensure effective career performance for their graduates, colleges will have to focus not only on the development of cognitive skills, but also their integration with high level interpersonal skills.

More important, the competence models suggest a sequence in the development of these abilities. For example, "helping" behavior by nurses seemed basic to "influencing" clients to change, which formed the foundation for "coaching" clients to make their own changes toward better health. For managers, some personal maturity and intellectual abilities preceded the development of interpersonal and entrepreneurial abilities. This suggests that personal growth is a key to development of other abilities and that a liberal arts degree can contribute to continuing ability development. "Accurate self-assessment" also showed up as a critical ability for managers. In the following sequential model of managerial abilities constructed from path and correlational analyses (see Mentkowski, DeBack, Bishop, Allen & Blanton, 1980, for technical details), "accurate self-assessment" is third in the sequence. This is some support for self-assessment as a prerequisite for other abilities, thus confirming that it be developed in college for use early in a manager's career.


CONCERN WITH AFFILIATION
PERCEPTUAL OBJECTIVITY
(.26)
MANAGEMENT OF GROUPS
(.25)
(.17)
(.26)
SELF-CONTROL
POSITIVE REGARD
.37
DEVELOPMENT OF OTHERS
.24
EFFICIENCY ORIENTATION
.30
14
STAMINA AND ADAPTABILITY
(.23)
(.17)
(.35)
(.18)
ACCURATE SELF-ASSESSMENT
(.21)
EXPRESSED CONCERN WITH IMPACT
USE OF SOCIALIZED POWER
USE OF UNILATERAL POWER
20
(.23)
28
(.23)
(.18)
(.34)
SPONTANEITY
(.22)
LOGICAL THOUGHT
DIAGNOSTIC USE OF CONCEPTS
.14
CONCEPTUALIZATION
.25
PROACTIVITY

Hypothetical Model of Competence in Women Managers and Executives

NOTE. Bivariate correlation coefficients are placed in parentheses. Numbers not in parentheses are path coefficients.

Since both models provide behavioral descriptors, and the managerial model is based on another study (Boyatzis, 1982), the models can be used to evaluate other programs in higher education as well. Because we have collected over 1,000 critical incidents of nursing and managerial work performance, we have a data base for developing more effective case studies and assessment criteria.

Abilities Function as an Organizing Principle for Role Performance and Career Satisfactions

Abilities Structure Performance at Work

What are the consequences of organizing learning in terms of abilities? Although alumnae use abilities taught in the curriculum, they also use abilities to create a theory of action that gets tested out in various work situations. This is in sharp contrast to the view that technical knowledge alone is the basis for effective performance. Alumnae do say they learn new technical skills, but they do not emphasize this knowledge when they describe how they go about deciding what to do ("My job is never the same . . . I use communication and analysis because you work very independently . . . you have to analyze the financial statements from taxpayers and determine a course of action").

Analysis of work behavior of experienced, outstanding professionals who are not Alverno alumnae shows that professionals use the abilities, and that abilities are an organizing principle for role performance. In managers' performance interviews, we coded few examples of using "Specialized Knowledge" as a basis for performance. Managers use these skills, but when they describe what they do in situations, broad abilities form the basis for their actions.

Technical Skills Are Not Enough

The fact that professionals in both studies demonstrated a wide range of complex abilities shows that graduates with functional or technical skills alone will not be effectively prepared to meet the demands of either nursing or management positions. Outcomes developed by colleges need to include more than the knowledge component of abilities. Abilities--which cross position levels and even careers--can be abstracted by colleges and built into general education curricula. Abilities that are profession-specific (e.g., "entrepreneurial abilities" for managers or "coaching" for nurses) become the cornerstone for further development in majors.

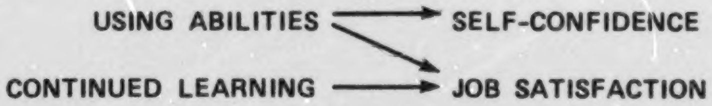
Certainly specific training is needed for any entry level position, but for persons who plan a career in the two professional areas we researched, an education that prepares them for the future will include learning to integrate a number of abilities, to test them out in a range of actual work situations, and to critically appraise one's own performance.

Alumnae Experience Competence and Career Satisfaction

Besides the abilities themselves and how they can be used to structure work, one of the kinds of learning that becomes most critical to career development and career management is the sense of competence. The concept of competence is clearly important as graduates organize their career role performance around abilities and try to improve it. But the experience of competence is a key factor in career management and job change. Graduates viewed work not just as a job, but as a career that changes and develops through work experience. Older women had a specific direction toward long range career goals; younger ones were more immediately focused on developing competence in their present job. But for all of them, career satisfaction is strongly related to their experience of competence on the job.

Experiencing competence seemed to be a critical factor in whether she changed her job or career, and seemed to "carry over" from one job to another. While graduates adapted to problems encountered in the first two years of work, including the traditional "reality shock" or disillusionment experienced by most new graduates, the persistent feeling of not being able to perform in the job role, for whatever reason, led to change of jobs, if not career fields. Such changes were generally successful and appeared to reestablish the woman's feeling of professional competence, the basis for her self-esteem. Apparently, these graduates can change jobs and careers effectively if they have a sense of competence and strive to develop it in whatever role they choose.

Using abilities led to self-confidence on the job and was the basis for job satisfaction. Being able to perform abilities led to staying on the job.



But another important indicator of job satisfaction was the degree to which alumnae experienced continued learning, an intrinsic value which motivates not only career development and job choice, but also determines whether an alumna continues to develop and adapt her abilities.

Education Develops Some Abilities; Experience at Work Develops Others

Some abilities are developed more through education than experience on the job. Nurses with a bachelor's degree were more likely to demonstrate "coaching," an ability that requires a complex form of helping the person to change his or her behavior. Nurses with more education were also more likely to demonstrate "independence." Those abilities developed through experience on the job, like "influencing," should be part of learning experiences coordinated with off-campus work placements. Both experience and education were related to "conceptualizing." More experienced nurses showed more "conceptualizing," but nurses with a baccalaureate degree made fewer conceptualizing errors that put clients at risk.

While level of education was less related to performance for women managers, those who had completed a management training program showed more "stamina and adaptability" and more "use of socialized power" in dealing with subordinates. Those who showed more rapid advancement in their company, and most likely a wider range of experience, demonstrated more "accurate self-assessment" and better developed "self-presentation" skills.

Both Perceptions and Performance Are Important Sources for Validating Outcomes

In both studies of professionals, we researched abilities through performance interviews, and also asked professionals to judge a range of performance characteristics. Managers generally perform abilities they independently judge as characteristic of outstanding performers. We found much less congruence between the performance of nurses, and those characteristics of job performance nurses judged as critical for education, selection and descriptive of outstanding peers. The findings do allow us to identify those abilities that professionals don't demonstrate but identify as important--such as negotiating and networking in management--that signal abilities that should be part of the manager's repetoire. On the other hand, abilities like demonstrating self-control are more important for effective performance than the managers realize, and this finding suggests that curriculum objectives be tied to the study of actual performance. The assessment of competence is important to realizing long-term goals (Klemp, 1980). Finally, the fact that both performance and perceptions are useful and perhaps contradictory data sources supports our plan to use performance measures in our future alumnae followup studies.

Alumnae Continue As Self-Sustaining Learners

Alumnae Continue to Develop and Adapt Abilities

Abilities are refined depending on their specific application. They are also combined in various ways given situational demands, and they are adapted to fit a particular action plan. Alumnae spoke again and again of combining ("trying to take everything and put it together in a workable process") and modifying their abilities ("I should not have come on so directly in getting him to try out this new equipment. I needed to show him how we can get the work coordinated and out faster, first"). In the studies of professionals, effective managers and nurses consistently used a combination of abilities in a single situation.

Alumnae Show Learning to Learn

But how does this new learning happen? While Argryis and Schon (1974) have described the importance of a theory of action in effective performance and McClelland (1975) has demonstrated that abilities are a basis for effective role performance, researchers and educators still must demonstrate how this happens. Educators question how and why abilities get developed so they can foster them in college. As we analyzed the alumnae interviews, a picture of ability-based learning began to emerge as it was practiced at work. Several components of "learning to learn" characterized alumnae behavior.

LEARNING TO LEARN

Experience learning as a continuous process

Tie knowledge, theory and experience to productive action

Apply abilities in action, get a response, and adjust accordingly

Integrate and adapt abilities

Think and perform in context

Alumnae experience learning as a continuous process. While they are highly successful in achieving their immediate career goals, they continue to regard learning as a major value and an important part of their lives after college. Their work setting makes major demands and opportunities for continued learning, an important part of developing competence in the job role. At the same time, they describe learning as an intrinsically rewarding activity which motivates career development, including job choice.

As educators, we also hope graduates do continue to have significant learning experiences after college. Abilities learned in college are an important stepping stone to effective performance ("What I learned most from Alverno and what's helping me most in my learning now is the whole process of learning, of starting and building on what you know, taking it from there."). Learning experiences are recognized and sought because "There's always a different situation that might come up." Another graduate comments that, "Alverno taught me that I like to learn and that I am capable of learning."

Graduates consistently speak of the importance of learning as "part of life," "part of my job" or "part of the person I am." An older graduate in management talks of her career plans in her current setting and adds, "If the learning starts tapering off I would consider going to another company, because I cannot be stagnant in learning." A young nurse affirms, "To me, living is learning."

Alumnae also seek more formal learning. In assessing commitment to more formal learning by graduating seniors, 36 percent expressed definite plans to continue their education after college, while another 57 percent indicated a desire to continue but did not specify a time line. These expectations were more than realized by the group of alumnae two years out of school. Forty-one percent did complete additional education, and of the 59 percent who did not, the majority expressed plans to acquire additional formal education at a future date, showing a high commitment to continued learning.

Another element of learning to learn is to *tie knowledge, theory and experience to productive action*. Alumnae describe putting these elements together in new situations. One alumna comments that, "When you're faced with a situation all of a sudden you start bringing out all that you were taught, trying to take every bit of education, suggestions from your supervising teachers, and put it together." Another says, "I have been gradually learning how to use my small group theories and relate them to the strategies others use. I've learned how to pick up on signals and back off a little bit and develop another round about route." This example raises another element of "learning to learn," that is, *applying abilities in action*, *getting a response*, and *adjusting one's performance or ideas accordingly*. "I had to spend a great deal of time observing, thinking, retrenching, that sort of thing," says one alumna. Another admits, "When I come across a fresh situation I feel I need more information so that I respond differently, I remember what I read, I sit back and analyze what happened, what I think should happen."

Alumnae also *integrate and adapt abilities* based on this experience of "observing, thinking, retrenching." Abilities are often integrated and overlapping in practical role performance. They range from simply becoming familiar with a new environment and new tasks ("Learning is a big part of what I do because when I started this job everything was new to me") to becoming an active learner in trying to carry out the role effectively ("I'm still learning what to use and I'm trying new things every year to see what's going to work"), seeking information from others and the situation.

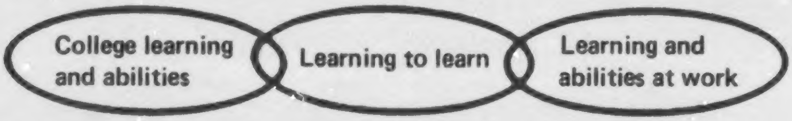
Ideals for performance and accomplishment must be modified in the work setting. Because of the environmental press, abilities learned in college must be adapted ("I learned you have to introduce changes very slowly and gradually and to teach about the change before it happens."). New attitudes, beliefs, perspectives and elements of self-concept or professional identity are acquired as well ("My ability to compromise and be more tolerant and open-minded has increased."). A young nurse who has already made a job change summarizes the processes of adapting abilities to new environments ("You have to think more in terms of 'How do I do this in this situation?' You are more consciously involved in what you are doing.").

Central to learning to learn is to think and perform in context. We see not the simplistic use of abilities as they have been first practiced, but rather a sensitivity to their discretionary use, depending on the constraints and challenges of a particular work setting or event. Alumnae see their actions in relation to their reading of the situation, and the consequences likely to occur.

For both nurses and managers, performance of abilities is influenced by the context in which it occurs. Of the nine abilities identified, nurses in the community health setting performed significantly more of them did those in the acute care and long-term care settings. The hospital and nursing home are generally seen as more structured and less open to the nurse's opportunity to perform the full range of her abilities. Managers from larger organizations demonstrate more of the competences, like "development of others," "management of groups" and "diagnostic use of concepts." Larger organizations and some types of industries seem to provide more opportunity for performing a wider range of abilities in the managerial role. Such influence by the work environment suggests that integrating and adapting abilities is critical for adequate performance and that graduates need to be able to think and perform with attention to the demands of particular settings. Context is an important factor in work performance. Abilities taught in college need to be practiced across settings.

In sum, college learning and abilities form a foundation for role performance after college, but learning to learn is a prerequisite to adapting abilities in the role one has. Thus, learning to learn is a process that enables adaptability to multiple settings; it links ability-based learning and work after college.

LEARNING TO LEARN LINKS EDUCATION AND WORK


College learning and abilities
Learning to learn
Learning and abilities at work

WHAT HAVE WE LEARNED?

We believe we can show that complex abilities can be successfully integrated as a result of a college experience stressing an ability-based, outcome-centered approach to learning. These abilities can be identified, developed and used to achieve success in educational and work environments. We can also identify contributors to effective outcome-centered learning. These include instruction itself, as measured by the amount of student change on faculty-designed instruments and those drawn from outside the college, curricular elements identified by students as important for their learning, and the impact of education on the demonstrated abilities of alumnae and other professionals.

Outcomes Are Complex, Holistic Human Abilities

We researched outcomes through several different frameworks and measures. It is clear that definition and measurement of college outcomes needs to include a range of dimensions: cognitive/intellectual process, affective/socio-emotional process, perceptions, motivation and performance. The outcomes studied by our battery of twelve external measures were differentiated into two separate factors at entrance to college and two years later, but were integrated by graduation. This suggests that educators may need to differentiate cognitive and affective aspects of abilities in order to teach for them. Most educators are struck by the difficulty of any attempt to separate these aspects. Yet attention to each dimension in turn may be necessary to enable students to integrate them later on. We need to study carefully just how this integration occurs, and what aspects of the learning process seem to develop this merging.

It is also clear from our study of student performance on external measures that educators defining competences or abilities need to attend to individual differences in level of cognitive development and what implications this has for developing instruction. Faculty who rated students on a set of performance characteristics seemed to be tapping student development, since the ratings correlated with cognitive-developmental level. If faculty are thus aware of students' developmental level--along with the more tangible abilities involved in their day-to-day assessments--we might infer that they also take developmental level into account in instructional planning and their interactions with students, to challenge and support student learning.

Further, complex outcomes need to include a performance dimension. Learning to perform, to link knowledge to performance, is a dimension of abilities separate from the cognitive-intellectual one. This is borne out by the fact that cognitive-developmental level correlates with the concrete experience/abstract conceptualization dimension of learning styles. Cognitive-developmental level does not correlate with the reflective observation/active experimentation dimension. Educators have long sought an adequate learning theory that incorporates not only knowledge and cognitive/intellectual processes, but also the more practical learning that occurs when ideas are tested out in actual situations. This practical learning can be expected to transfer across contexts to the world of work. For students in our study, learning to perform, to link knowledge to performance, enabled them to find reasons for learning in a variety of ways. They tried out the competences through application to professional performance and in their personal life. By doing so, they experientially validated the competences or abilities they were developing. The concept of "competence," which implies knowledge and action, becomes a motivational link as well. Students began to see themselves as competent. Thus, outcomes have a perceptual and motivational dimension that assist in their internalization and transfer. Values and motivation for performance have their roots in students' justification for learning as a stepping stone to a career and economic mobility. Along the way, self-sustained learning, a liberal arts value, becomes part of the student's reasons for continuing in college. The student perceives herself as a self-directed learner, who seeks "well-roundedness," as well as career goals.

Complex abilities, which include cognitive, affective, behavioral, motivational and perceptual components, do fit together and/or integrate to some degree by graduation. This suggests that the abilities are holistic, that is, that they involve the whole person.

Outcomes Are Developmental and Teachable

Outcomes Develop as the Result of the Curriculum

In this study, complex outcomes or abilities change over time, and are related to performance in the learning process. Thus, they are developmental or teachable. We can link outcomes specifically to college instruction in five ways: (1) by showing that students change on faculty-designed assessments as the result of instruction, (2) by the analysis of confidential interviews where students and alumnae attribute changes in their learning to curricular elements, (3) by the analysis of student change on the twelve external instruments drawn from outside the college, (4) by analysis of alumnae ratings and confidential interviews where graduates describe using abilities in post-college settings, and (5) by showing the impact of education on the demonstrated abilities of professionals who are not Alverno alumnae. All of these sources validate the testimony of faculty who think they see students learning, external assessors who credential some of these abilities, and the testimony of other students and alumnae who say they are learning them and whose reports become more complex in describing their abilities in college, at work and in their personal lives.

Just as student perceptions change, faculty ratings of performance characteristics also show students changing. Student performance of faculty-defined abilities of Communications and Valuing are related to instruction. Students, by their own report, find Communications and Social Interaction abilities useful for functioning in personal and professional roles.

On the other hand, there are other complex outcomes and competences where the link to performance in the learning process was less clear (e.g., Social Interaction and other, externally assessed generic abilities). Older and younger students differ on some abilities and not on others at college entrance, and show some different patterns in developing them. How education interacts with experience to enable the student to build on informal learning outcomes is important in designing instruction to fit the adult learner. These results show that most of the outcomes or abilities we studied are developmental and teachable, and that we need to more carefully probe the dimensions of those other abilities that are less easily linked to college learning. college learning.

Outcomes Develop at Different Times

Equally important is the time frame for development. There are differences in when these abilities develop during the college years. And as educators have always suspected, there is a difference between the general education experience and the later years when the student focuses on a major. Older and younger students perform differently with respect to some cognitive-developmental patterns and abilities but not others. Further, abilities that may be differentiated during the first two years of college become integrated during the last two years, although how this happens is not clear to us now. The competence models developed from effective professionals in nursing and management show that abilities differ in complexity and sequence and suggest that the pedagogical order of abilities is important and can be identified. Professionals more likely develop some abilities exclusively on the job. Experience may add to a student's ability to take advantage of college, but some key abilities critical for effective work performance are clearly developed over time in long term formal learning experiences.

Developmental Patterns Are Subtle and Complex

When we look at the rate and quality of change, we note the kinds of subtle and complex developmental patterns that will ultimately be of most use to practitioners and to theorists. As we study students' developing perceptions, we see that students do value open-mindedness and self-direction and seem to demonstrate it increasingly. We would like to be able to account for how students actually do undergo the changes that they demonstrate in their interviews. It is our belief that communicating these subtle and complex patterns across disciplines, and to a wide range of faculty, is a prelude to identifying the criteria for assessment of these abilities. We also think that being better able to define criteria for assessment will lead to improved instruction, and consequently, improved educational validity of the learning process. Such efforts will begin to link developmental theory and educational practice (Astin, 1983).

Older Students Also Develop Outcomes as the Result of Instruction

Students progress through the assessment process with no noticeable deficit for the older student. The very structure of Weekend College (an alternate time frame which requires more independent learning) attended mostly by adult students presumes that the older adult can move at a more intense rate. Not only must she evidence this cognitively, but also in organizing multiple roles and responsibilities. The older student's life experience is not ignored, and there is no evidence of older students having any disadvantage from being away from formal academic work. In fact, there is a cognitive advantage that allows them not only to cope with the program but to cope with a concentrated program that's even more demanding. That presumption is borne out by students attending Weekend College who also performed on external instruments; changes are not differentially less than the performance of students in the regular college time frame. And older students also develop their abilities as the result of instruction. However, our analyses of the external instruments show that age is an advantage in some areas initially, because the experience that it implies enables the student to take on this cognitive overload and deal with it successfully. And by the time they are more than two years along, the educational environment itself is a more likely determinant of learning. At the same time, older students begin at the same place as traditional age students in some areas, such as their understanding of classroom learning processes and roles.

This difference between the older and younger adult shows up after college. The experienced adult has more specific direction toward long-term career goals, in contrast to the younger graduate who is more focused on immediate ones. Both groups, however, report having to apply the same kinds of abilities to post-college work settings--interpersonal and reasoning abilities. Thus, adults have an advantage in some areas but not in others. But it appears that the ability-based curriculum at least is capable of capitalizing on the differential abilities of the new learner.

Another reason for this confidence on our part is that the college we have been studying has a traditional mission to serve working class students who are often first generation college students. For this student group, higher education can build on their particular strengths and background and enable them to continue capitalizing on it even when they've graduated. Women alumnae we studied show upward job mobility compared to their mothers.

Outcomes Include Self-Sustained Learning that Links Education and Work

Career-Oriented Students Develop Liberal Learning Values

This study also shows that the new student can be served when educators act on the assumption that abilities learned interact with the student's value for learning. Values for education in this student group are linked to career outcomes. Indeed, a career-oriented rationale for college learning seems to describe today's student (Astin, 1982). The concern is that work-related rationales will bypass or shut out the traditional liberal arts values for lifelong, continued learning, for dealing with multiple perspectives, for appreciation of the arts and humanities, for personal growth, and for benefiting others in society. The results from this study indicate that those fears are unfounded for this student group. During college, values for personal growth and continued, lifelong learning emerge. These values become linked to professional role performance, and to a perception of the self as a competent, self-directed learner. That these values for learning continue beyond college is evidenced by job changes made by alumnae who have inadequate opportunities for new learning at work.

Liberal arts educators do, however, need to be aware of the values for learning of its student groups. Apparently the concept of competence and learning to learn and to perform are strategies that can build a bridge from the practical values students bring with them to the more intangible values for lifelong, continued learning and professional role performance--where benefiting others is a primary aim. Clearly, responding to new students means being as insightful as possible about the reality of the learning experience for them and how they relate values for learning to their own goals for being in college.

Learning to Learn Skills
Are Developed in College

From the beginning, we were aware that one intangible goal of the curriculum was that students develop as independent learners able to learn on their own. But we were unprepared for the sharply focused emphasis on learning to learn by students, their easy identification of its several aspects and their attribution to curricular elements, the dramatic results in changes in learning style, or that both older and younger students needed to "learn how to learn" in relation to classroom learning processes and roles. Further, this internalized process was a key link between college-learned abilities and performing them at work after college, and even accounted for job satisfaction.

We also found that any concept of learning needs to consider not only the intellectual part of learning but also its performance dimension. Taking responsibility for her own learning was a recurrent theme in the student interviews, and she linked it directly to opportunities for experientially validating her abilities. Applying knowledge and abilities, adapting them in various contexts and using them in a discretionary way depending on the situation was described by students and further elaborated by alumnae.

We can now better describe what it means for a student to be able to learn on her own. And development of these skills is apparently an important indicator of her ability to gain from college. Some students did not develop learning to learn as well as others, and they did not seem to gain as much from college as a result. We need to further explore this concept, primarily by looking at intra-individual differences in patterns of development on the several measures: interview, learning style inventory and the Perry scheme of intellectual and ethical development. Our use of the learning style inventory as a diagnostic measure for students in a beginning seminar (Deutsch & Guinn, Note 1), our use of various learning strategies developed from the Perry scheme in a communications seminar (Loacker & Cromwell, Note 4), yields a further test of our assumptions. Our efforts to assess experiential learning and to develop a production instrument are providing new insights on how learning to learn is developed in internships (Mentkowski, O'Brien, Cleve & Wutzdorff, 1983). Further, the faculty perspective on how learning to learn develops is described in their integrated evaluation of student performance (Six Performance Characteristics Rating). Results from all these measures will help us to develop a diagnostic tool for both faculty and students to assess students' developing ability to become self-sustaining learners. Faculty could also then get a better handle on who is changing in what kinds of ways, and be able to read the signals for change and transition. In doing so, we are moving towards the study of more individual patterns of growth. Clearly, the development of learning to learn skills and their use, as well as the accompanying values and attitudes about learning cannot be left to chance development in a college curriculum.

Alumnae Use Learning to Learn Skills

Learning to learn means discovering how to derive from an environment and experience what one needs to know to adapt one's abilities. Our results strongly suggest that using these skills and the consequent adaptation of abilities is such an important process for the graduate that college learning needs to specifically train for it. While college graduates will always face disillusionment and the conflict between realizing their ideals and making a living, how they deal with the challenge seems an important component to making the transition from college to work. Student values for learning to learn are realized in alumna motivation to use and adapt abilities to a range of contexts. Alumnae test out new ways of doing things to find out what will work. Learning how to adapt abilities involves a process of applying judgment and abilities in action, getting feedback and adjusting accordingly.

Learning Continues After College

That the value for learning is internalized is shown not only because career satisfaction is built partly on opportunities for new learning but also because graduates go on to more schooling. Alverno students come to college for job preparation. From their point of view, the college prepares them adequately, and they are almost all successful in finding the job they want after graduation. Over 40 percent of the alumnae we studied have continued formal learning two years past college, and another 50 percent expect to do so in the future.

College Outcomes Promote Careering and Professional Performance

Abilities Identified by Alverno Educators are Demonstrated by Professionals

The outcomes of college are generic, that is, they transfer to post-college settings. While level of education is linked to effective performance on the job, the abilities identified as crucial to effective performance, like reasoning abilities, on the face of it, are similar to those identified by educators. In contrast, interpersonal abilities, long an expected result from informal learning alone, are critical to effective performance as evidenced in the professional's competences and the observations of working alumnae. This validates the Alverno faculty's choice of abilities like valuing and social interaction as similar in importance to intellectual abilities. The finding also suggests that all highly complex cognitive abilities be integrated with high level interactive ones.

Clusters of abilities carry forward from college to the world of work. While they must be integrated and adapted to the work place, they contribute to effective performance. Both competence models of professional performance show that professionals demonstrate a wide range of complex abilities. While the type of organization in which they are employed seems to influence the competences they perform, there are abilities that are generic, that transfer across setting and occupation.

Abilities Learned in College Are Used by Alumnae

There is a remarkable congruence between the abilities graduates say they use in the work place and those Alverno educators consider important outcomes of college. Intellectual and interpersonal abilities are both mentioned as necessary for coping successfully with a range of situations. And abilities function as an organizing principle for role performance and careering.

Professionals' perceptions of abilities descriptive of outstanding performers were congruent with demonstrated abilities on the job for managers but not for nurses. Why this is the case is not clear, but it suggests our plan to assess the effective work performance of alumnae in addition to their perceptions is wise. The fact that alumnae have focused on developing abilities during college might make for more congruence, but this cannot be taken for granted. Since career variables like salary and status are not linked to effective performance for women in an emerging field like management, colleges seeking to validate their curriculum for women alumnae need to rely on performance as their indicator in addition to measures of perceptions and self-report indicators of career advancement.

Competence is a Concept and an Experience

College outcomes and work are related very strongly by the notion of self-perceived competence. It is a cognitive organizer for learning both in college and at work. It is one of the most powerful experiential triggers for development according to alumnae testimony about how they manage their career changes, and career satisfactions. The mere act of identifying outcomes and giving people a chance to practice them has a powerful impact that carries from college to later life. Educators attempting outcome-centered education are in large part responding to the press for work usable education without sacrificing what education has traditionally meant. It seems fairly possible to take a liberal education and define it in terms of outcomes and make those outcomes experienceable to students, creating an effective, lasting link between education and the world of work without having to sacrifice the value of those complex outcomes that motivate the liberal educator. The outcomes of liberal education can be identified, and when identified and experienced by the student, do persist.

Validating College Outcomes is Feasible

Throughout our research and evaluation efforts, we have paid particular attention to discussing methodological issues usually generated by large scale validation efforts. Several methodological contributions are discussed here because they point to the feasibility of either starting or continuing such work.

Defining Validity as a Concept for Higher Education

The press for accountability in colleges creates a need for evaluation and validation strategies. But assuming that such strategies can be applied without concern for the history and traditions of the liberal arts would only serve to alienate many faculty and administrators. Demanding that colleges now devote significant effort and resources to establishing validity in ways outlined by the behavioral sciences alone, ensures the failure of the approach.

Some liberal arts colleges have valid concerns about the press for accountability, and reject the assumption that establishing evaluation and validity are the most cogent response to such pressures. Fears that such attention to evaluation would mechanize, or otherwise destroy the primary values of the liberal arts have been expressed. If we attempt to identify and validate complex abilities, won't we end up with abilities that are mechanistic and so specific that a quick study can demonstrate them easily? Strategies seen as advances in the behavioral sciences and educational research community may not be appropriate for liberal arts contexts. And the practice of program evaluation and validation of developmental outcomes needs new approaches. In any science, behavioral or otherwise, new paradigms are critical for solving new problems.

Throughout our reports, we speak to the issue of adapting validation goals, strategies and designs to the particular goals, strategies and curricular plans of the faculty and involving faculty in carrying out validation efforts. Establishing validity means first identifying its meaning and use in a particular context. We do not suggest that a college incorporate our design or methods, but we hope colleges will find some of the strategies we used helpful to ensure that their definition of validity and validation design builds on and is consistent with existing academic administrative structures and college-wide goals. We found validity best defined as a process that is developmental, illuminative and diagnostic, and relates theory to practice and research to evaluation. Such a definition of validity suggests a validation design fitted to the context in which it is applied. The extent to which results from validation studies can be incorporated into an ongoing curriculum and used by faculty to improve it is the ultimate test of their validity. In this liberal arts setting, faculty involvement was essential to meeting research objectives.

Designing Validation Models

Although we claim that validation models must be designed to correspond to the goals and curriculum of a faculty, validation models in a particular setting also need to be designed in view of the broader issues of teaching and learning that challenge education today. Findings must be generalizable to other settings and populations if our concentrated efforts across colleges are to lead to exchange among institutions and accountability to society at large. We thus designed a validation model with four levels of triangulation, building externality into every level of the triangulated model so that findings could be used not only to improve a particular curriculum, but also to generate findings that would generalize to teaching and learning settings and populations at other institutions. As we widen the lens, bringing in other perspectives and frameworks, we generate results that are of interest not only in improving one curriculum, but that have the potential to improve education in other settings. This attention to externality also solves problems of subjectivity where a college takes on its own validation since, in this case, student and alumnae outcomes are compared to the standards and norms of other groups and other frameworks of learning and development.

There are other inherent contradictions in designing validation models than the one just mentioned. Since findings from validation efforts should result in curriculum improvement, validation models need to have a dynamic quality that fits an ever-changing curriculum. Experimental/control group comparisons are often not possible in settings where variables, treatment and setting are changing. Yet the model must allow examination of the relationship between student outcomes and performance in the curriculum and show that instruction enhances student performance. Further, models must generate group results that can influence broader curriculum and program development and shape the long-range policies of a college, yet they must also generate findings at the more micro level of analysis to enable exploration of individual differences and teaching strategies that work for individualized instruction. In addition, models must allow a series of findings from a range of data sources to emerge over time since a faculty need fast results to solve curriculum problems that need immediate resolution. Yet the need for long-range longitudinal designs and the complex effort over time needed to research some questions means waiting for results.

The validation models with four levels of triangulation also works to resolve these contradictions. We studied abilities from multiple points of view, across multiple points in time, using multiple groups, with multiple opportunities for critique and comparison. This strategy of investigation is consistent with multiplicity in ways of knowing most representative of methodology across the liberal arts disciplines. As we widen the lens, we bring more comparisons into play to test out assumptions. Longitudinal and cross-sectional designs used within the larger model enable us to pinpoint change and relate it to student performance in the curriculum from several perspectives. Further, the triangulated model allowed for comparisons across various groups. Longitudinal designs allow for exploring unique patterns in intra-individual change, and delving more deeply into single abilities and intra-individual change patterns. Since the model calls for multiplicity of comparison over time, the model generates results in some form throughout its existance. Although the longitudinal designs employed do not produce immediate results, finding from the other designs are generated in a more timely fashion.

Can a Liberal Arts College Accomplish Its Own Evaluation and Validation?

During the past decade, responding to demands for accountability usually meant contracting with an outside evaluation consultant or agency who then developed and executed a design. Resources for such external evaluations are dwindling. And persons doing the research are absent when the real work of evaluation begins--implementing the results. We built our own internal and external evaluation/validation mechanism, and then monies channelled into validation served as seed money to develop the abilities of college staff. While the evaluation staff fluctuates depending on availability of outside funds, there are consistent, evaluation and validation studies constantly ongoing and supported by the college.

Ongoing, intra-institutional evaluation has raised the quality of other internal evaluation conducted in the college. Faculty outside the behavioral sciences are more willing to consider evaluation as part of curriculum development because they no longer bear all the responsibility for a task that has its roots primarily outside their field. An expert staff is also available to assist faculty with grants calling for evaluation, and faculty are more willing to enter into relationships with outside funding sources. Funding agencies are more likely to provide funds for a project that has the mindset and demonstrated expertise for rigorous evaluation and validation. Responsibility for self-evaluation encourages close attention to exercising objective, analytical judgment, and to submitting plans and reports to outsiders for critique and review.

Developing Participant Involvement Strategies

One outcome of our efforts was developing strategies to involve students, alumnae, and professionals from the business and professional community. Methods of assessment often involve using an unobtrusive measure where the participant is not sure what is being assessed. In our case, we needed to use measures that had face validity for a range of persons. We needed to generally inform them about our objectives so they would continue to participate in longitudinal research. But how could we guarantee our results would not just reflect a halo effect or the willingness of participants to "help" us by using as much of the acceptable jargon as possible?

We did inform participants of the nature of our validation goals. But we also used a range of complex indicators and assessments (in-depth interviews; cognitive-developmental instruments which assess growth over long periods of time) to help ensure that outcomes were actually there. And we had to develop some data analysis methods to differentiate beginning from fuller understanding of the concepts we were assessing. At the same time, we met research standards for objective data collection and analysis.

Using informed participants also served to meet other college goals. Creating relationships with alumnae, building bridges to the professional and business community, and valuing students' evaluation, helped enormously to establish the credibility of our college and its programs with these groups.

Researching Women's Abilities

Because Alverno is a women's college, the research reported here is on women participants. Women from ages 17 to 66 are drawn from student, alumnae and professional groups. Because of the paucity of findings on women's abilities, results reported should be helpful to other educators and researchers who are attempting to understand women's abilities and develop programs for the large numbers of women returning to college.

Using Expert Judgment in Production Measures

In liberal arts colleges, expert judgment of complex abilities is the primary mode of assessment. An English theme, history term paper, Fine Arts performance, student teaching, Nursing clinical, or Science lab all call for an extensive "production" by the student and complex judgment by an instructor on the extent to which the performance meets criteria. The closer the student performance is to abilities students will be demonstrating across work and personal roles, the more confidence the instructor has that the measure is valid. Yet many paper and pencil tests that call for recognition alone are heavily used because of their efficiency in administration and scoring. With the advent of the computer, these measures are also more efficiently validated.

In general, however, assessment of upper level work is often far too complex for such recognition tasks, and some disciplines in the arts and humanities are less likely to develop and use measures that rely on quantitative methods of assessment developed in the behavioral sciences. If criteria for judging are defined to give a picture of the abilities being assessed, faculty can more easily discuss common abilities that cross disciplines and set the stage for reinforcing these abilities--like communications--across courses. And such measures become likely selections for a validator seeking to measure the outcomes of college.

Thus, we used expert judgment in developing or choosing instruments for establishing program validity. Both arts and humanities, and behavioral sciences faculty are open to qualitative analyses of student responses, and expert judgment seems to mesh more with assessment strategies already in use. Faculty become more systematic and efficient expert judges very quickly, and are interested in specifying the basis for judgment and creating criteria. We have therefore adopted some measures, designed to be cross-disciplinary, as validation instruments. Some measures serve multiple purposes for diagnosing and/or credentialing student performance, and also for validating the curriculum, adding to instrument efficiency.

In addition to creating and validating measures they already use in the curriculum, faculty have been able to create complex new instruments and apply them with the validation team. Thus, faculty in an institution can, with professional help, do much of the work of creating cross-disciplinary, production measures of abilities, and also judge student performance.

Validating Nontraditional Assessment Techniques

In this study we validated a range of faculty-designed assessment techniques, and criteria and a process for judging student performance on the Perry scheme. We tested out a variety of strategies. Current methodologies for validating faculty-designed, generic ability instruments reflect a pattern analysis approach, rather than score analysis, correlational analysis or an item analysis approach alone. These methods have implications for similar programs which are seeking new methods to establish construct as well as content validity of complex assessment instruments.

Testing Out New Measures of College Outcomes

Several criticisms of previous college-wide assessments like the Scholastic Aptitude Test include lack of relationship to later careering and professional performance. Grade point average, aptitude and achievement scores have not predicted later success in some studies (McClelland, 1973). We have therefore used a variety of new cognitive-developmental, learning style and generic ability measures, performance interviews and inventories of professionals, as well as in-depth interviews of student and alumna perspectives to test out new methods of assessment. At the same time, we used some of the more traditional methods as a check on how results from newer asessment techniques compared. We found that newer methods do take more time and involvement but are more efficient for other reasons. The descriptions of outcomes these measures yield stimulate more discussion by faculty, have more validity for performance after college, and so enable colleges to establish validity for particular professional areas. For example, by identifying competences that make for effective performance in the nursing profession across various contexts, we can build better in-college testing techniques and at the same time, contribute to revising state board examinations in nursing to make them more performance-based.

In general, cognitive-developmental measures, measures of learning styles, and some generic ability measures proved to be effective measures of change during college, and our studies of professionals' performance yielded a cadre of abilities that can serve as criteria for assessing the performance of alumnae. This will enable us to build assessment techniques for judging performance interviews of alumnae, a future goal.

Disseminating and Implementing Results

Research findings need to be disseminated to educators in a mode that has some practical implications for educational programming. Research progress, initial findings and problems had to be presented in understandable language and linked to practical issues important to other colleges attempting to improve their programs. The strategies used in this project include: (1) Twenty-seven presentations at state, national and international conferences and specially convened seminars; (2) Nine presentations to Milwaukee professional groups; (3) Fourteen research reports, eight instruments, and 20 other publications; (4) Six progress reports to the National Institute of Education and six presentations at project directors' meetings; (5) Seven research reports and over 20 presentations to student, alumna, and professional participants; (6) Thirty-three presentations to Alverno faculty, trustees, and advisory councils; (7) Twenty-three presentations, with materials, to representatives of 168 institutions or departments within those institutions who visited Alverno; (8) Dissemination through mailed materials to 207 institutions and representative departments; and (9) Materials dissemination to representatives of at least another 510 institutions or departments within those institutions at the 27 off-campus conferences and seminars. Such dissemination strategies led to constant questioning of the research methodology and identifying those

In addition, research findings could begin to be implemented through tryouts of various instructional and assessment strategies. Deutsch and Guinn introduced learning styles assessment as a regular part of new student seminars (Deutsch & Guinn, Note 1; Mentkowski & Giencke-Holl, 1982); Loacker and Cromwell adapted criteria for judging performance on the Perry scheme to communications learning and assessment strategies (Loacker & Cromwell, Note 4). Schall and Guinn used the Behavioral Event Interview competence assessment technique and a performance characteristics inventory in a project to expand faculty awareness of abilities professionals use on the job. About 20 faculty interviewed another 130 professionals in a number of professional areas during the summer of 1982 (Schall & Guinn, Note 3; Loacker & Schall, 1983). Student perceptions were used to improve career development services (Fowler, Mentkowski & Schall, 1981). Faculty in natural sciences and technology designed investigative learning laboratory experiences and researched resulting student performance and perceptions (Truchan & Fowler, 1980). Data from the longitudinal study of student change helped inform practice in the Office of Instructional Services (Neises, Note 5).

Interview analyses of students, alumnae and other professionals have proved to be a rich source for curriculum improvement. Results from student and alumna interview analyses describing the development of learning to learn are being used to create a new instrument for assessing students on these skills. Alumnae interviews have also been analyzed for clues to personal and professional role integration (Mentkowski & Much, in press). How alumnae integrated career and family responsibilities has implications for how faculty can assist students of all ages to anticipate and/or manage this dilemma while still in college. We are currently preparing the 1000 critical incidents from the nursing and management performance interviews for use by faculty to create cases, instructional examples, and assessment techniques.

SUMMARY

This ongoing effort to enhance the quality, effectiveness and validity of education in the liberal arts has already contributed to several common objectives of college, their faculties, students and alumnae, the educational research and evaluation community, outcome-centered education, as well as our own college.

Ongoing research and evaluation efforts like this one and others can help colleges to take the initiative to define and demonstrate their outcomes to various constituencies who ask that such outcomes of college meet certain standards for use. Showing just how the more complex thinking and problem solving abilities show up at work, and how adaptability in learning on the job functions for the new graduate in the business community can make a difference to this segment of society who has often created their own educational technology rather than turning to colleges for help. Building a bridge to the business and professional community in ways that show we value their input in education--not just for ideals but practical abilities--can encourage them to join forces with educational institutions. Demonstrating that we are willing not only to identify outcomes as goals, but to deal with practical realities in making college work for students and for the business and professional communities we serve opens up a wealth of input, particularly for smaller colleges. The brain drain of professors from the research university to corporations can be reversed at the level of undergraduate education if we tap the expert judgment of top, corporate personnel.

Students and alumnae also benefit. Students benefit because they begin to feel that education is a process. Changes can and do occur, and students have input into program design and execution. Such a model sets up the expectation of themselves as change agents within the institution, and suggests a creative tension between the ideal and the real while they are still in college. While letting them in on the imperfect role of authority, it prepares them for the dynamic interplay between their own expectations for change and the conditions that are necessary for making changes.

This is particularly of benefit to the cadre of new students who are most likely adults. Already part of the working world, they come to college with a more practical stance and expect more concrete benefits. They are under immediate pressure to show family and employer that the financial and time investment is of benefit at work and at home while they are still in college. This is more critical for women since many manage multiple roles. And the traditional age college student, who is currently more focused on practical career goals, will benefit from new strategies that build on prior formal and informal learning experiences.

Efforts like this one are expected to more directly benefit faculty in making it more possible for them to improve instruction. Most educators, pressed by the day to day frustrations and pressures of classroom instruction are open to identifying problems in teaching and looking for solutions. Having this helpful source, in addition to others, maintains and stimulates their work. When results from a cross-college effort are available on a continuing basis, a common excitement and probing occurs. A collaborative sense of purpose strengthens.

Not to be overlooked is the benefit to interdisciplinary discourse of insight into student development and learning processes that can cross the barriers erected by the most independent department. Educators need both anecdotal and systematic results that describe ways in which students develop beyond one instructor's class, to life after college.

This model shows how faculty, in their roles as educators and instructional researchers, work together with faculty's concerns driving the validation effort. It enables faculty to effort. It enables faculty to measure things they really care to change, instead of measuring outcomes for which they are held accountable but that are not their own goals, toward which they are not about to change their teaching. It is also a model for devising really usable validation tools, because they come from the faculty's own goals and questions. That puts faculty in the position of being able to join with the administration and with the institution as a whole, in explaining to the rest of society what it is that education does. It enables the faculty to take the initiative and to regain the position of educating society about education, a task which has too long fallen into the hands of journalists.

There are some contributions to ability-based, outcome-centered education that also emerge from our work. First, we have felt confirmed in our decision some ten years ago to specify outcomes as a faculty and to develop curriculum through that common lens. We have certainly had more direct access to establishing the validity of our various outcomes and assessment process. The apparent success so far of our attempts to validate one faculty's ability-based approach to education suggests that outcome-centered education in general may indeed be a meaningful advance toward making college outcomes accountable.

In doing so, we have been able to open the more subtle aspects of the learning process to critique and clarification. New theories of learning, particularly for adults, can emerge from this dialectic. Focusing on outcomes, and defining them as complex processes, has enabled us to link learning to learning goals. Identifying abilities is an activity that helps students to cognitively structure and organize their own vision of the learning process in school, gives them a framework for establishing the relevance of liberal education to their career, and helps them organize their careering after college. Finding that such abilities and processes transfer to their personal lives during college frees them to become more open to learning not directly related to a specific occupation, but to human growth. The effort to assess outcomes actively, as well as to identify them, gives the student an important experiential sense of her own competence that seems to be a major catalyst in her development, both in school and at work after college.

A student's sense of her own proven competence becomes the organizing principle for her vision of her own growth and her strongest sense of proof. After college, it becomes a criterion for judging whether she is effectively managing her career, for judging whether she is satisfied in her job, for making job changes if necessary, or for staying where she is if she is satisfied. This experience is so powerful in college that after college it becomes her major criterion for assessing and managing her career.

A major reason for assessing the outcomes of college is to allow faculty to better accredit their students and to allow the institution to be more accreditable. But we have also found that the experience of identifying abilities and demonstrating them across multiple contexts is of tremendous learning benefit to the student. A college that gives a student this experience is giving a student an advantage, whether or not outside groups would identify those same abilities, or judge her effectiveness in the same way.

Validation efforts in higher education also contribute to the educational research and evaluation community. Program evaluation as a discipline is new and is currently called on to provide technical assistance in the design of large validation studies in a wide variety of field settings. New technologies must be created to meet the demand, and methods that work in some educational research settings do not necessarily transfer to the cross-disciplinary atmosphere of a liberal arts college, or even to more technologically-oriented universities where each discipline has its own well developed methodologies. It is not surprising, then, that we would have new validation definitions and strategies, improved methods for conducting educational evaluations, insights into disseminating and implementing results, and specific procedures for creating an atmosphere of fairness and respect for the input of our constituencies and informed involvement of our participants.

We have made advances in the assessment of complex abilities including creating production measures where expert judges are trained to make qualitative judgments through objective, analytical processes. Better ways to specify the criteria for judging complex abilities and for ensuring their validity result.

While we identify the values of validating outcomes for other colleges and constituencies, we trust the value to our own college comes through. We have made a commitment to continue our evaluation/validation process as part of the institution and a permanent component of the learning process. Our Office of Research and Evaluation is budgeted on a permanent basis, although staff and breadth of activity may vary somewhat depending on the strength of outside funding.

NEW DIRECTIONS

There are several clear directions for future research and curricular applications. One is to probe further the meaning of the complex cognitive-developmental patterns, learning styles and personal maturity/interpersonal and reasoning abilities we have begun to study. Improved criteria for assessment, improved instruction, and improved educational validity of the learning process will result. Researching such abilities can become a common task in higher education networks. We have begun to involve other colleges in one such effort to better define, instruct and assess for critical thinking (Cromwell & Allen, 1982).

It is now clear that abilities are complex processes where knowledge is only one component, and that the transfer of them to situations during college and afterward involves learning how to adapt abilities already learned to new situations and environments. Such learning on the job is much less guided and is predicated by "learning to learn" or "lifelong learning," familiar terms but not well-researched concepts. The development of preferences for a range of learning styles and change in cognitive intellectual growth measured by the Perry scheme may be the first indicator that learning to learn is developing for the student. But how do these beginning preferences become translated into sophisticated processes, into a "theory of action" for self-directed learning?

We also need to make use of the patterns we have observed in students' developing abilities over time to research individual differences in ways of learning and in the expression of these complex abilities. An initial stage has concentrated on describing broad patterns of change. It does not speak to the question of who changes and why. For whom is college more effective? Who responds better to certain aspects of the curriculum, who does not? Retaining students who are not performing is critical to the survival of many public and private colleges. Analyses of individual differences can specifically improve instructional strategies. We studied student change in a conservative research design to obtain a picture of the actual benefits of the curriculum. We also need to compare student entering abilities with those of students who did not persist, to see what abilities predict staying in college. We have identified some determinants that account for how much individual students benefit from the curriculum. These patterns need to be linked to more specific instructional strategies.

One practical way to build on prior efforts and to research these questions is to establish a system to continue to collect learning progress information based on developmental pattern data. By monitoring students' progress through the learning process more carefully, and building our expectations on what we now understand about the development of abilities, we could better pinpoint students who need more support and challenge, and intervene more quickly than longitudinal studies permit.

Such an effort could also build on our increased confidence in the validity of expert judgment in identifying and assessing for abilities, and patterns in the way they develop. Qualitative expert judging processes can illuminate complex student thought processes and behavior. Assessing complex competences, developmental level and learning styles is possible. Understanding such complexities is not beyond our grasp. We reinforce any efforts to further develop production type measures and judging processes of abilities that cross disciplines in the liberal arts. Many of the external measures we used need further work to be more useful to colleges attracting working class and minority students. We need to examine in-depth the range of individual differences that occur in the normative patterns of change we have identified in this report. While our initial approach provides developmental norms for students at this college, and broadens the normative base for college students in general, it does not speak to the question of who does best in college and why. Retaining students who are not performing, particularly those who have not had strong educational backgrounds, is critical to the survival of many private and public colleges. An analysis of these individual differences, and the abilities we studied, will be extremely helpful to other colleges. Further, we used a conservative research design to measure the effects of the learning process on students precisely to get a better picture of the actual benefits of college. We studied those who graduated from college across time. We need also to compare the entering abilities of those who did not graduate with those who did.

Abilities demonstrated by professionals have good face validity with the outcomes educators usually identify. But these abilities, when described in a developmental sequence that takes into account the role of formal education and on-the-job experience, can help students in various occupational groups to be better prepared. Case studies and assessment criteria are one curricular application. Career advising based on professionals' careering histories are another. We need to continue to follow our alumnae and their developing performance abilities. A modified format of the job competence assessment performance interview would be a next step in studying alumnae performance.

Such efforts, to research the meaning of abilities, to find ways to incorporate professional and career development abilities into the curriculum, to look for individual differences in the way in which they develop, and to create strategies for more individualized instruction are important new directions. We also need to study how abilities are adapted and focused through continued learning, to expand our description of learning to learn theoretically and practically. Creating a student progress information system that makes use of our current understanding of abilities, and our new assessment techniques can help to realize these goals. Our continuing interview research on individual patterns of learning and the determinants of change should also benefit faculty understanding of student growth.

Finally, we need to continue our efforts to demonstrate a variety of validation strategies, models, methods and instrument designs. The fact that a liberal arts college has been successful in carrying out an elaborated effort, with the collaboration of a higher education and research network, is proof that colleges can develop their curriculum, do their own research and validation, and therefore continue to survive in American higher education.

Meanwhile, our overall plan is to continue opening many of these issues and findings in more detail to the critique and comment of faculty in higher education, a process that will engage us and others in a renewal of interest in our chief concerns as educators.

We have been excited while learning, using, and evaluating the concept of outcome-centered education. Alverno has been committed not only to designing this kind of a curriculum, but also to designing an intensive measurement strategy to test out these ideas. The model presented here can be applied in other educational settings. It offers insights into new approaches in adult development which may have far reaching consequences in settings outside of higher education. In this way, we begin to ensure that we develop abilities that truly last a lifetime.

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RESEARCH REPORT ABSTRACTS

Validating Assessment Techniques in an Outcome-Centered Liberal Arts Curriculum: Valuing and Communications Generic Instruments

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ALVERNO COLLEGE

Two studies test methodology for validating assessment techniques in a performance-based liberal arts curriculum. Alverno College has a system-wide performance based curriculum, with an assessment process that requires students to demonstrate incremental gains while progressing through six sequential levels in each of eight competences. The eight competences are integrated with the concepts in each discipline. Students are required to attain each competence level in sequence to demonstrate cumulative achievement. These two studies assess the effects of instruction on patterns of student response using instruments. Both instruments are "generic," that is, general criteria are integrated with criteria specific to the way the ability appears in the discipline in which the instrument is used. Studies of two generic instruments, assessing level 4 of the competences of Communications and Valuing are reported here.

Twenty students performed on the generic Communications instrument after two years in college; another twenty performed upon entrance to college. They demonstrated abilities in four modes of communication: speaking, writing, listening and reading, providing data on student performance across different modes of the same competence. The student is also asked to self-assess her performance in each mode on the same criteria on which she is judged by the assessor(s). Eleven students performed on the generic Valuing instrument after two years in college; another twenty performed upon entrance to college. Students demonstrated value and moral judgments and decision-making modes. Students also self-assess their performance.

In the Communications study, students with no instruction demonstrated a wider range of variability in performance as compared to the instruction group, who showed a less dispersed pattern. Student performance varies with the mode of communication. The instruction group performed significantly better particularly on the upper levels of the four communication modes. The different patterns of the interrelationships of student performance across the four modes are seen in relation to the levels. Students who had instruction can better self-assess their performance.

In the Valuing study, the instruction group performed significantly better than the no instruction group. Data from the instruction group provided support for the validity of the cumulative hierarchical nature of the competence. The no instruction group did not show any consistent cumulative or sequential patterns. Overall, the instruction group demonstrated clusters of relationships among scores on the criteria and the no instruction group appeared to perform in a randomly scattered manner, indicating effectiveness of instruction. The study methodology reflects our current pattern analysis approach, rather than using score analysis, correlational analysis or an item analysis approach alone. The interpretation of the results and the methodology developed have implications for similar programs which are seeking out new methods to establish construct as well as content validity of complex assessment techniques used in performance-based curricula in higher education.

Validating Assessment Techniques in an Outcome-Centered Liberal Arts Curriculum:
Social Interaction Generic Instrument

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ALVERNO COLLEGE

This report explores issues related to the validation of more nontraditional assessment techniques, and tests some ways such studies may proceed. We examined the appropriateness of various methods for validating a generic competence instrument that measures Social Interaction, a construct with little or no history as a teachable college outcome or measure. We compared the performance of 69 uninstructed students on entrance to college with that of 32 students who had two years of college instruction on each of the Social Interaction dimensions (Preparation, Demonstration, Self-Assessment and Leadership), and the specific dimension criteria.

Results indicate similarities in performance between traditional age instructed students and mature uninstructed students. While this may be expected, it also indicates that group comparisons may not be an effective strategy for validating assessment techniques if the ability is one developed through prior informal as well as college learning. Despite our efforts to do so, we were not able to control for the myriad range of variables that are likely to affect the results. When performance of such an ability also interacts with a set of personal and ego development variables, separating out the specific effects of instruction that show significant differences through group comparison is not an effective strategy, especially given the small sample sizes generally available.

However, some Social Interaction criteria did indeed separate the uninstructed students from the instructed students when we combined all students in a discriminant analysis. These criteria are more closely related to those aspects of Social Interaction that are learned as part of the more specific Social Interaction learning experiences. Thus, including students with a broad range of age and formal learning experience did lead to an effective strategy for identifying those Social Interaction behaviors that validate the construct. Clearly, the study of assessment techniques should not be limited to univariate methods; patterns of coherent group performance provide us with a more holistic picture of performance, particularly of Social Interaction, not well understood and measured compared to some other abilities like Communications.

The present study outlines a procedure by which the integration of information about competence construct, different group characteristics and criteria evaluation contribute to an information base for instructional development, re-evaluation of competence definitions and revision of instrument criteria which measure these behaviors. The study helps to illuminate a key question in approaching the validation of any faculty designed instrument measuring important but not well defined abilities new to higher education instruction: What strategies are appropriate given where this instrument and constructs are in their current development?

Validating Assessment Techniques in an Outcome-Centered Liberal Arts Curriculum:
Insights from the Evaluation and Revision Process

Alverno College Assessment Committee/
Office of Research and Evaluation

ALVERNO COLLEGE

The Alverno College faculty has designed a curriculum and assessment process to assist students to develop and demonstrate ability in a variety of competences. Faculty, individually and as a group, design assessment instruments which then come under the scrutiny of other faculty in a continuous process of review and redefinition. This evaluation and revision process stimulates evaluation and revision of the instruments in a systematic way.

Validating assessment instruments is an unusual goal for a college faculty to pursue. To validate means that concepts of the abilities or competences assessed and the means for doing so must be carefully thought out, subjected to rigorous reasoning, and constantly reviewed against student performance outcomes. This report summarizes questions, suggestions, concerns and insights generated from feedback sessions with faculty who submitted their instruments for a validation study. Sixteen instruments were identified by departments as ready to submit because faculty judged them sufficiently developed to evaluate. Three validation strategies worked best of those tried. One is pre- and post-instruction comparison which determines if changes in student performance can be attributed to the effects of instruction. A second is criteria evaluation, which involved the clarification, revision and refinement of criteria based on an analysis of student performance. A third is establishing the inter-rater reliability of assessor judgments, which enables a test of reliability as well as the development of instrument criteria. Criteria evaluation appears to be most helpful when the instrument is being evaluated and revised. Pre- and post-instruction comparisons are used most effectively after faculty have judged the instrument as meeting most other instrument design guidelines. Inter-rater reliability studies are most useful when they are conducted concurrently with criteria evaluation. The validation studies that were synthesized for this report show that direct involvement of faculty in analyzing student performance data and probing validity questions generates a broad scope of validity issues.

Validating Assessment Techniques in an Outcome-Centered Liberal Arts Curriculum:
Integrated Competence Seminar

Alverno College Assessment Committee/
Office of Research and Evaluation

ALVERNO COLLEGE

The Integrated Competence Seminar assessment technique allows students to demonstrate integration and transfer of learning in three situations: Oral Presentation, In-Basket Exercise and Group Discussion. Assessors observe and evaluate performance against specified criteria, and give feedback to students on their performance. A behavioral criteria checklist permits evaluation of inter-rater reliability, and validation of the technique through comparison of quantified assessor judgments with other student performance measures and a battery of external criterion measures administered to students in a longitudinal study of college outcomes (Mentkowski & Strait, 1983).

Assessor judgments correlated in the 70's. The In-Basket Exercise was the most difficult and the most valid in terms of correlation with measures of students' cognitive development and other generic abilities. Oral Presentation showed mixed results, and the Group Discussion correlated with other measures in ways opposite to the expected directions. When age, background and college program are controlled, there were no significant relationships between the number of credits accumulated and number of competence level units achieved. Thus, the In-Basket had some performance validity, the Oral Presentation is equivocal, and the Group Discussion had relationships opposite to our expectations. The finding on the Group Discussion supports our earlier findings with respect to a Social Interaction generic instrument.

Generally, the effort revealed that the In-Basket exercise most accurately measured abilities of Analysis and Problem Solving. The Group Discussion, a measure of Social Interaction, worked less well. The study points to the importance of continuing to develop nontraditional assessment techniques like In-Basket, and to revise the measure with particular attention to the links between Group Discussion criteria and the Social Interaction ability it represents. The Integrated Competence Seminar has since undergone extensive revisions by a group of faculty specializing in assessment design, based in part on the findings of this study.

Validating Assessment Techniques in an Outcome-Centered Liberal Arts Curriculum: Six Performance Characteristics Rating

Alverno College Assessment Committee/
Office of Research and Evaluation

ALVERNO COLLEGE

The Six Performance Characteristics assessment technique provides a means for faculty to judge students in a systematic way over time on developmental characteristics which apply to their performance across disciplines and across competence areas identified as goals of liberal learning by Alverno faculty. Descriptions of six performance characteristics were prepared and first tested by faculty with seniors graduating in the spring of 1978. The characteristics were integration, independence, creativity, self-awareness, commitment, and habituality. The characteristics were defined by sets of descriptors for the "Beginning Student," the "Developing Student," and the "Graduating Student." Pilot study results indicated some discriminating power (students graduating with honors were rated significantly higher than students graduating without honors). The following year all students in the college were rated to collect additional information on inter-rater reliability, the developmental character of the ratings, and the extent to which the six characteristics were differentiated in ratings.

Results from the first all-college administration provided evidence of acceptable inter-rater reliability, and supported the developmental character of the definitions through significant mean differences between classes. While the power of the measure to distinguish between students at different levels was demonstrated, it was found that all characteristics followed nearly identical patterns, raising further questions concerning differentiation among them.

Six Performance Characteristics ratings were conducted on all classes in 1979, 1980, 1981 and 1982, as part of a comprehensive program validation which included other measures of student performance within the curriculum, and longitudinal assessments of student development and change using a battery of external criterion measures (Mentkowski & Strait, 1983). Ratings from the longitudinal study sample of two consecutive entering classes confirmed that a single factor accounted for 90% of the variance in ratings on each characteristic on three different occasions. Using the single factor, it was found that students were rated at significantly higher levels over time, corroborating the cross-sectional evidence for the developmental character of the procedure. The rating factor was not associated with other college performance measures in the longitudinal study when the influences of student background and program differences were controlled. There was, however, evidence that ratings discriminated between students on academic probation and those who were not, irrespective of class standing.

Relationships between the Six Performance Characteristics factor and the measures of human potential revealed that the faculty were making judgments based on a general dimension associated with several external criterion measures of intellectual, ego, and moral development. The strongest pattern of associations was found with a measure of Perry's scheme of intellectual and ethical development during the college years (Perry, 1970, 1981). The Alverno faculty is continuing to work with the assessment technique, attempting to refine the definitions of several characteristics so that a more differentiated picture of student development may result.

A Longitudinal Study of Student Change in Cognitive Development, Learning Styles, and Generic Abilities in an Outcome-Centered Liberal Arts Curriculum

Marcia Mentkowski Michael J. Strait

ALVERNO COLLEGE

That students change in college is taken for granted. That students change as the result of performing in a particular curriculum is more difficult to show, and describing who changes and why, in relation to which complex abilities, is even more illusive. This longitudinal and cross-sectional study was designed to investigate three questions: Do students change in broad abilities indicative of human potential for cognitive-development, learning styles and other generic abilities? Can we attribute change to performance in a performance-based curriculum, rather than to age, background factors and program characteristics? What are the underlying themes or patterns of change that could be used to assist curriculum developers in higher education concerned with responding to current frameworks in adult learning and development?

Over 750 students participated in the longitudinal and cross-sectional studies by completing a battery of twelve instruments with developmental characteristics, and which employed both recognition and production tasks. The instruments were drawn principally from three sources: cognitive-developmental theory, experiential learning theory, and competence assessment designed to measure abilities which link those learned in college to professional performance afterwards. Students ranged in age from 17 to 55; 200 formed a core group for the longitudinal study using a time series design with assessments at three times during college. Change occurred in varying degrees across the instrument set; some of this change could be attributed to performance in the learning process when age, background and program characteristics were controlled. Cognitive-developmental and learning style measures were better indicators of change than were the generic ability measures, suggesting that educators can measure development as an aim of higher education. As expected, recognition measures showed more change than the production measures. Initial performance at entrance to college was related to age for the cognitive-developmental measures, and to high school grades for the generic ability measures. While more change occurred during the first two years (between the entrance assessment and the one two years later), the effects of the learning process on student change were more evident during the second two years (between the midpoint assessment and the one two years later near the end of college). Students appear to demonstrate two dimensions of cognitive development, intellectual ability and socio-emotional maturity at entrance to college; these abilities are integrated by graduation.

Implications for practice are that change is measurable, and that broad outcomes of college can be specified and assessed. Future interpretations of results specific to the several instruments and their interrelationships will more directly contribute to our understanding of the development of abilities learned in college. New outcome measures have been tested, and the longitudinal data base of college learning is necessary to establish relationships between abilities learned in college and professional performance in followup studies of alumnae.

Student Perspectives on Liberal Learning at Alverno College: Justifying Learning as Relevant to Performance in Personal and Professional Roles

Nancy Much Marcia Mentkowski

ALVERNO COLLEGE

Approaches to the study of student outcomes at Alverno include measuring performance in the curriculum, and student changes on measures indicative of human potential for cognitive development, learning styles and generic abilities (Mentkowski & Strait, 1983). This study explores student perspectives on learning as another valuable data source for validating abilities learned in college (Mentkowski & Doherty, 1983). How do students understand and justify learning outcomes? How do they understand liberal learning as relevant to performance in personal and professional roles? Detailed analysis of interviews from 13 traditional age students at the end of their junior year were supported by systematic reading of 100 interviews from 37 women students interviewed longitudinally at the end of each college year. A qualitative methodology was selected that recognizes the subjective nature of the data and treats this as a valuable source. Systematic procedures were devised for construction of content patterns representing student perspectives on how they understand and justify learning and give meaning to day to day learning experiences.

Two outstanding patterns consistent with curricular emphasis and student orientation appear. First, students express a career centered rationale for college education. Learning is justified primarily in terms of its relevance to practicing a particular career after college. Second is a heavy emphasis on learning "how-to-do" things; learning is or ought to be useful. Students regard the learning process as concerned with teaching them how to perform and apply what they know. The meaningfulness of day to day learning experiences is predicated upon perceived relevance of these experiences to professional performance. While students express dissatisfaction with learning experiences for which they cannot find career relevance, they succeed in developing a justificatory rationale for assimilating all kinds of learning including "wellroundedness," a variety of discipline content areas and the competences, to the idea of professional role performance. For these students, the competences are central to the structuring of learning to perform; "use" or "application" of learning refers to the competences. Other kinds of substantive knowledge, observations, ideas, concepts, theories and so on, are assimilated to the competences which structure learning to perform, and are linked to role performance. Competences offer ways of looking at things, ways of understanding, ways to be aware of what is important. Students experience the competences as meaningful and useful and anticipate their application to the work setting. For competences Communications and Social Interaction, for example, students report feelings of increased mastery, control and certainty in three areas that students regard as important and which are often problematic for young women: interpersonal relations, identity and personal choice. The competences support student's perceptions of being more in control and more effective in common everyday social and work settings, including those encountered in off-campus experiential learning settings and personal life. Through experiential validation of the competences, students are able to construct a justification for liberal learning in which personal growth and effectiveness mediate between educational experience and concepts of professional role performance.

Careering After College:
Perspectives on Lifelong Learning
and Career Development

Marcia Mentkowski Nancy Much Laura Giencke-Holl

ALVERNO COLLEGE

This initial study of alumnae from Alverno's outcome-centered curriculum asked four questions: How are alumnae learning to learn at work, and do they describe lifelong learning? What abilities and processes enable transfer of learning to professional performance and careering after college? What are alumnae perspectives on careering and professional development? How do the expectations of students and realizations of alumnae compare? We conducted followup interviews with 32 alumnae, and administered a questionnaire to 56; 63 seniors also completed the questionnaire.

Interview analysis indicated that continuation of learning is a positive value, is part of developing competence in the job role, and is valued as intrinsically rewarding, which motivates career development and job choice. Learning on the job is based on abilities, including those learned in college. Complex abilities especially important for new job roles are interpersonal abilities learned in college. They were strongly emphasized among both younger and older women and across all professional groups, as an important foundation for both performance and continued learning. Reasoning abilities such as analysis, problem solving, decision making, planning and organization also transfer to work. These abilities are integrated and overlapping in practical role performance. Learning on the job, apart from additional technical learning, involves further development of major abilities and their integration and adaptation in relation to work contexts. Learning how to adapt abilities involves a process of applying judgment and abilities in action, getting feedback and adjusting accordingly. Learning to learn means discovering how to derive from an environment and experience what one needs to know to adapt one's abilities. Most women viewed work through some concept of careering, looking beyond the present job to a professional future. Professional ideals were important in relating to work. Older women had a specific direction to long-range career goals; younger women were more immediately focused on development of competence in their present jobs. Career satisfaction was strongly related to experiencing competence on the job. Satisfaction with ability to do a job well is fundamental for careering. A feeling of persistent inadequate performance of the job role led to change of jobs or career. Such changes re-establish a feeling of professional competence. Work satisfaction involved job enjoyment, a sense of relaxation and being comfortable with work; and progress. All women had strategies for career progress, but older women had more complex and long range career strategies than younger women, who focused more on excellence now.

The cross-sectional questionnaire study found that seniors expect to work after college; 96 percent of alumnae sought work, 92 percent succeeded, 89 percent found work directly related to their major. These women had more professional positions than their mothers. Seniors had higher career expectations than alumnae were able to realize after two years, but alumnae rated satisfaction with a first position and potential for advancement as above average. Alumnae show more positive attitudes toward college learning after two years than seniors; both rated it above average. Forty-one percent of alumnae reported additional education; 56 percent said they planned more. Alumnae attribute more importance to educational goals than graduating seniors; both said they achieved their important career and personal goals. Older alumnae view analysis and self-directed learning as more important than do other groups. Potential for advancement is powerful in determining career satisfaction.

Developing a Professional Competence Model for Nursing Education

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James M. Bishop Zita Allen Barbara Blanton

ALVERNO COLLEGE

The major purpose of this study was to create a generic competence model for effective nursing performance. The major outcome is a codebook describing nine generic abilities. The competences were derived after an intensive qualitative analysis of performance interviews from 80 outstanding and good nurses in which nurses discussed what they actually did in situations that led to effective and ineffective outcomes. A peer nomination questionnaire yielded outstanding and good groupings of nurses; a background questionnaire provided information on education and experience. Nurses were employed in a long-term care setting, an acute care setting and a community health agency.

Nurses perform a great deal of Helping, a competence which fits with the more traditional role of the nurse. But they also perform Independence, Influencing and Coaching to a large degree, and they perform Conceptualizing. These competences describe today's nurse as an active, influential professional who demonstrates independence and analytical thinking in her role. More of these active competences were demonstrated in the community health agency than in the acute care agency; the acute care agency and the long-term care agency seem to have a more structured environment with regard to roles and tasks. Nurses in a more structured situation may not demonstrate some of these abilities to a greater degree because of the demands of the setting.

The more experienced or more educated nurse is likely to demonstrate more Conceptualizing, less negative Conceptualizing, more Ego Strength, and more Independence, Influencing and Coaching. These competences taken together seem to have an underlying component--an active, thinking, influential style where the nurse also strives to assist the client to take on more responsibility for his or her own care. Some of these abilities appear more in the community agency, an agency we believe is likely to be more supportive of these competences, where more educated nurses are employed, and where nurses are likely to have more role autonomy.

This study contributes to efforts by nursing associations and educational programs to assess effective nurse competences. In this study, nurse educators and nurse practitioners were able to cooperate in a common effort to develop a competence model that can improve nursing education. The 350 situations described by the nurses in the performance interviews can also serve to improve case study and other instructional and assessment materials. Nursing curriculum needs to build on the performance abilities of effective nurses.

Developing a Professional Competence Model for Management Education

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William McEachern Deborah Fowler

ALVERNO COLLEGE

This study identifies abilities or competences that ensure effective managerial performance and sequences them to create a model of effective managerial performance. Performance, perceptions and careering and professional development of 103 women managers and executives from 53 Milwaukee private corporations are described and related using a recently developed performance measurement system. Three outcomes result: a competence model of effective managerial performance for improving management programs; a pool of over 500 behavioral examples set within particular contexts that can be used in instruction and assessment; and better advice for women students seeking examples of careering and professional development and how it relates to effective performance in the managerial role.

No one competence dominates the performance of these managers. They demonstrate abilities across the broad spectrum of interpersonal, intellectual, entrepreneurial and socio-emotional abilities. Women managers demonstrated intellectual and entrepreneurial abilities to the same degree as they demonstrated interpersonal abilities. Educators creating sequential management curricula and managers planning their own professional development can benefit by knowing whether some competences are prerequisites for others. Several factor, cluster and path analyses were performed. Competences are in the main independent of each other but some are best learned in sequence. A manager's ability to initiate rests on intellectual skills; ability to get the job done rests on people skills. Underlying these is self-assessment, the ability to learn from one's experience.

Abilities effective managers judge as critical to outstanding performance are generally the ones they perform in day to day situations. Two abilities important to outstanding performance according to managers and that were not performed often in this study are using networking and negotiating win-win situations. Demonstrating self-control and positive regard for others, abilities demonstrated often, are apparently more critical to effective managerial performance than managers judge them to be.

Implications for management education are that programs teach and assess for a range of complex abilities. Traditional management education has focused on developing particular technical skills yet specialized knowledge did not play a critical or decisive role in the situations described by these effective managers. Education that prepares for the future will include learning to integrate abilities, to test them out in a range of work situations and to critically appraise one's own performance. Both work environment and job function affect the extent to which these abilities are demonstrated; this suggests that adaptability of one's abilities is critical for effective performance. There are, however, a common set of broad competences educators can expect will generalize across situations and contexts. Abilities on which the Alverno program is built mesh with those demonstrated by effective managers. The study provides a cadre of interview material for building realistic and relevant instructional experiences, a model for sequencing competences, and insights into careering for structuring career development activities.

Using the Perry Scheme of Intellectual and Ethical Development as a College Outcomes Measure: A Process and Criteria for Judging Student Performance[1]

Vols. I & II

Marcia Mentkowski Mary Moeser Michael J. Strait

ALVERNO COLLEGE

This study describes use of the Perry scheme of intellectual and ethical development as a broad measure of growth in college in an outcome-centered curriculum. Issues that arise in applying cognitive-developmental measures to validate a learning process in relation to students' projected potential for development during college are discussed, as are those questions educators raise in applying and measuring the scheme, examines how colleges can demonstrate change as a result of curricula, improves adequacy of judgments made in relation to the scheme, and identifies issues educators need to consider in using the scheme appropriately.

The report's major focus is description of the criteria and process that yields judgments of student performance relative to the Perry scheme. The criteria (descriptive statements) and judgment process, together with a set of 46 examples showing how the criteria are applied independently by assessors and through consensus, should assist other persons to analyze student performance relative to the scheme. Reliability of the process for assessment and validity of the criteria and the instrument stimuli and mode are examined in relation to assessor decision-making and judgment, and student performance on essays. The study underscores the importance of continuing to research expert judgment as a technique for assessing student performance in college.

Parts of Volume I and assessor training materials in Volume II can serve as a training and rating manual. Volume I contains the process for judging student performance on the Perry scheme, the Alverno criteria used in the judging process, and documents steps taken to establish 1) reliability and validity of the judging process and criteria, and 2) validity of the Alverno criteria in relation to their use by assessors. Data reported contribute to establishing face, psychometric, criterion group, longitudinal, convergent/divergent, and educational validity of the Measure of Intellectual Development (MID). This measure, based on Knefelkamp and Widick's work, has a history of research and use to which this report contributes.

Persons new to the Perry scheme, with little if any background in developmental psychology and theories of assessment did learn to rate essays at satisfactory levels of inter-judge agreement prior to consensus. Agreement prior to consensus increased during the training sessions from 57% to 65% to 78%, which we believe resulted from concurrent improvements in four phases of criteria development. Inter-judge agreement on final rating of almost 3000 essays was 76% prior to consensus, a percent reached by a new assessor trained in the judging process. Inter-judge agreement with an expert external assessor was 67% prior to consensus. Analyses of almost 20,000 assessor judgments showed that the themes of the developmental scheme were found useful in judging essays. Some criteria were used more than others. Criteria of a general and specific nature were equally useful. Criteria from position 2 "What to Learn," position 3 "How to Learn" and position 4 "How to Think" were used most. Criteria that describe aspects of a stable position are distinguished from those that describe the dynamics of transition between positions. Thus, the criteria describe the evolution of student change. Generic criteria are distinguished from those specific to essay type, and suggest applicability across other essay types or performance modes like the interview. Essay specific criteria show how the content of an essay interacts with underlying structures in development.

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[1] Foreward by William G. Perry, Jr.

Volume I also describes results from a five-year longitudinal study of student development on the Perry scheme (Mentkowski, Moeser & Strait, 1983), including relationships to other cognitive-developmental measures (Kohlberg, Rest, Loevinger, Piaget). Participants were 750 women aged 17-55. Applying the method and criteria, we found that the measure shows definite change in both cross-sectional and longitudinal studies. The criteria and process did work to describe differences between students and student change over time. The patterns of change, however, are the intriguing results. Each of the three essays, Best Class, Decision and Career shows change. But the change is not always straightforward. When development occurs depends on the area. Rate of development is related to age for decision-making and career understanding at entrance to college, but not for students' understanding of classroom learning processes and roles. But after two years, older students have made more immediate progress in understanding concepts such as learning through multiple ways, learning from peers, and becoming independent at one's own learning. Formal learning experiences are necessary for enhanced understanding of these concepts. Student change on any of the three areas of development is not related to high school grade average when students enter college, nor does it account for change during college. Students change on the Perry scheme, and development is differential depending on the area of development.

These results illuminate the way students change in college, and examine the issue of the contribution to student development by the college experience for both traditional and non-traditional aged students. This study points to the need for careful translations between any theoretical model of development and its adaptation for program evaluation, instruction and assessment, and further theory building.

APPENDIX: DISSEMINATION

DISSEMINATION

We disseminated progress and outcomes of the research reported in this overview and summary with several strategies. Altogether, the dissemination effort yielded 64 presentations to persons from other institutions in education, government and business, which together with materials mailed, reached 885 institutions and representative departments from all 50 states and from 13 countries. An additional 53 presentations were made to Alverno affiliated persons. We also created or contributed to 55 publications.

Specifically, we (1) made 27 presentations at state, national, and international conferences, and specially convened seminars; (2) made nine presentations to Milwaukee professional groups; (3) created 14 research reports, eight instruments, and contributed to or created 20 other publications that brought requests for more information; (4) prepared six progress reports for the National Institute of Education and made six presentations at project directors' meetings that identified problems and issues encountered in carrying out the research; (5) created seven research reports for students, alumnae, and professional participants, and made over 20 presentations to them; (6) discussed progress, procedures and results in 33 presentations to Alverno faculty, administrators, trustees, college committees, departments and divisions, and outside advisory councils; (7) made 23 presentations at Alverno College Workshops and Seminar Days, where we distributed materials and discussed several issues described in this overview with representatives from 168 institutions or departments within those institutions; (8) mailed requested materials to persons at 207 institutions and representative departments; and (9) disseminated materials to representatives of at least 510 of the many institutions or departments within those institutions (partial listing as registrant lists were often not available) attending the 27 off-campus conferences and seminars at which research findings were presented. Strategies are summarized below.

- Twenty-seven presentations at state, national, and international conferences and specially convened seminars
- Nine presentations to Milwaukee professional groups
- Fourteen research reports, eight instruments, and 20 other publications
- Six progress reports to the National Institute of Education and six presentations at project directors' meetings
- Seven research reports and over 20 presentations to student, alumna, and professional participants
- Thirty-three presentations to Alverno faculty, trustees, and advisory councils
- Twenty-three presentations, with materials, to representatives of 168 institutions or departments within those institutions who attended Alverno
- Dissemination through mailed materials to another 207 institutions and representative departments
- Materials dissemination to representatives of at least another 510 institutions or departments within those institutions at the 27 off-campus conferences and seminars

Presentations at State, National and International Conferences and Seminars

Throughout the grant period and afterward, we presented the research rationale, progress and preliminary and final results at state, national, and international meetings and specially convened seminars. Participants at these meetings included researchers, persons in business and industry, college teachers, staff and administrators, officials of foundations and associations for colleges, officials of the Department of Education, NIE, Fund for the Improvement of Post-Secondary Education, National Science Foundation, National Endowment for the Humanities, and other private and public agencies.

Mentkowski, M. *College as an enabling institution: Moral and intellectual development in the college years*. Presentation at the annual meeting of the Association for Moral Education, The Ohio State University, Columbus, OH, November 1984.

Mentkowski, M. *Developing the valuing ability through the college curriculum*. Presentation at the annual Student Affairs Institute: Promoting Ethical Development in College Students, Iowa State University, Ames, IA, July 1984.

Doherty, A., Loacker, G., & Mentkowski, M. *Assessing and validating learning outcomes*. Presentation to the University of New Mexico School of Medicine and the University of Montana School of Law, Albuquerque, NM, April 1984.

Mentkowski, M., Doherty, A., & Read, J. *Abilities that last a lifetime*. Invitational presentation to selected attendees at the annual meeting of the American Association for Higher Education, Chicago, IL, March 1984.

Mentkowski, M., Doherty, A., & Read, J. *Abilities that last a lifetime: Outcomes of the Alverno experience*. Presentation at the Brookings Institute, sponsored by the National Institute of Education and the American Association for Higher Education, Washington, D.C., January 1984.

Mentkowski, M., Doherty, A., Loacker, G., & Read, J. *Developing abilities that last a lifetime*. Presentation at the Carnegie Corporation, sponsored by the American Association for Higher Education and the Carnegie Corporation of New York, New York, December 1983.

Mentkowski, M. *Cognitive development in the college years: The Perry scheme and reflective judgment*. Presentation with Blythe Clinchy, Mary Brabeck and Karen Kitchener at the annual meeting of the Association for Moral Education, Boston, MA, November 1983.

Mentkowski, M. *Guiding the student toward becoming an independent learner*. Presentation at the annual meeting of the National Academic Advising Association, St. Louis, MO, October 1983.

Mentkowski, M. Assessing experiential learning. Presentation at the Council for the Advancement of Experiential Learning Institute: Learning and Personal Development: The Synthesis of Knowledge and Experience, Georgetown University, Washington, D.C., August 1983.

Mentkowski, M. Can the concept of human development supply a unifying purpose for higher education? Presentation at the Conference on Education and Training for Human Development, Memphis State University, Memphis, TN, June 1983.

Mentkowski, M. Is there life after college? Establishing the validity of college-learned abilities for later careering and professional performance. Presentation at the Eleventh International Congress of the Assessment Center Method, Williamsburg, VA, June 1983.

Mentkowski, M., & Strait, M. A longitudinal study of change in cognitive development and generic abilities in an outcome-centered liberal arts curriculum. Paper presented at the meeting of the American Educational Research Association, Montreal, Canada, April 1983.

Mentkowski, M., Moeser, M., & Strait, M. Using the Perry scheme of intellectual and ethical development as a college outcomes measure: A process and criteria for judging student performance. Paper presented at the meeting of the American Educational Research Association, Montreal, Canada, April 1983.

Mentkowski, M. Student development on the Perry scheme. Presentation at the annual meeting of the Association for Moral Education, Minneapolis, MN, November 1982.

Mentkowski, M. Current uses of experiential learning theory at Alverno College. Presentation at the Brain and Learning Styles Conference, Chicago, IL, October, 1982.

Strait, M. A study of college outcomes. Presentation to the Illinois and Wisconsin Association of Registrars and Admissions Officers, Rockford, IL, October 1982.

Mentkowski, M. Issues in program evaluation. Workshop at the Second Conference on General Education at the Inter American University of Puerto Rico, San Juan, Puerto Rico, September 1982.

Mentkowski, M., & McEachern, W. Developing a professional competence model for management education. Presentation to the Tenth International Congress of the Assessment Center Method, Pittsburgh, PA, June 1982.

O'Brien, K. Developing competences for a business and management program. Workshop for the annual meeting of the Organizational Behavior Teaching Society, Cleveland, OH, Summer, 1982.

Mentkowski, M. *Using the Perry scheme of intellectual and ethical development as a college outcomes measure*. Paper presented at the "Whence and Whither" Perry Conference, Augsburg College, Minneapolis, MN, June 1981.

Friedman, M. *Validating change in student outcomes*. Presentation to the Wisconsin Association for Collegiate Registrars and Admissions Officers, Sheboygan, WI, October 1980.

Loacker, G., & Mentkowski, M. *Establishing educational competence using assessment center methodology at Alverno*. Presentation to the Eighth International Congress of the Assessment Center Method, Toronto, Canada, June 1980.

Mentkowski, M., DeBack, V., Bishop, J., Allen, Z., & Blanton, B. *Developing a professional competence model for nursing education*. Paper presented at the meeting of the American Educational Research Association, Boston, April 1980.

Friedman, M., & Mentkowski, M. *Validation of assessment techniques in an outcome-centered liberal arts curriculum: Empirical illustrations* Paper presented at the meeting of the American Educational Research Association, Boston, April 1980.

Mentkowski, M. *The design and assessment of an undergraduate curriculum whose goal is the development of valuing*. Paper presented at the meeting of the Association for Moral Education, Philadelphia, PA, November 1979.

Mentkowski, M. Research implications and results from a study of learning styles and professional competences. In A. Wutzdorff (Chair), *Learning to learn at work: Case study, implementation model, research implications*. Symposium presented at the meeting of the Council for the Advancement of Experiential Learning, St. Paul, MN, April 1979.

Mentkowski, M. *A research and evaluation model for validating the abilities learned in college for later success*. Paper presented at the Sixth International Congress on Assessment Center Method, White Sulfer Springs, WV, June 1978.

Presentation to Milwaukee Professional Groups

Another strategy for dissemination calls for presentations and distribution of materials to community professional groups. Most of these groups consist of representatives of various professions. The following list is indicative of the range of groups to whom we disseminated information and materials:

> Presentations of the nursing study by Vivien DeBack, Nursing Chairperson, to Milwaukee professional community groups:

- Greater Milwaukee Area Nursing Service, 1980
- Nursing Education Administrators Group, 1980
- Nursing Administrators of the Visiting Nurses Association, 1980
- Sigma Theta Tau, a national nurses honor society, 1980

Presentations of the studies of alumnae and professional managers and nurses presented by Marcia Mentkowski to the following groups:

- Legal Auxillary of Wisconsin, June 1980
- Association for Women Lawyers, December 1981
- Inter-Group Council, a group of professional women, June 1982

Presentation of results from the management study by Marcia Mentkowski and Kathleen O'Brien were made to:

- Professional Dimensions, a group of professional women, including management study participants, February 1983

Presentations of alumnae study of the integration of career and family by Marcia Mentkowski:

- "Work and family: How can I do both?" Alverno College Telesis series: Building on our experience: Women talking with women, 1982, 1983, 1984

Publications

The 14 research reports and eight instruments are listed on pages 45-49. The following are additional publications where the research has been disseminated; either the findings were the central subject, or are referred to in the publication.

The article describing the major findings, "Abilities That Last A Lifetime: Outcomes of The Alverno Experience" appeared in the February 1984 AAHE Bulletin (official publication of the American Association for Higher Education distributed to 6,500 educators). Notice of the research findings appeared in the New York Times, USA Today and The Milwaukee Journal in late 1983 and 1984.

Miller, F. American Association of Higher Education features Alverno. *Alverno Today*, May 1984, pp. 1 and 4.

Lewis, J. A college capitalizing on student abilities. *The New York Times*, Section 12, April 15, 1984.

Letson, L. Research project shows Alverno's "Ability Curriculum" deserves the attention it's getting across the country. *School Sisters of St. Francis: United States*, *3*(2), April 1984, p. 3.

Do abilities learned in college make a difference? *Alverno*, Winter 1984, pp. 2-5.

Loacker, G., Cromwell, L., Fey, J., & Rutherford, D. *Analysis and communication at Alverno: An approach to critical thinking*. Milwaukee, WI: Alverno Productions, 1984.

Green, S. A college whose time has come! *Alpha*, *6*(6), March 1984, p. 1.

Mentkowski, M., & Doherty, A. Abilities that last a lifetime: Outcomes of the Alverno experience. *AAHE Bulletin*, *36*(6), February 1984, pp. 5-6 and 11-14.

Wisconsin college teaches thinking, problem-solving. *USA Today*, *2*(94), Friday, January 27, 1984.

Bednarek, D. I. Alverno scores well in study. *The Milwaukee Journal*. Tuesday, December 13, 1983.

Office of Research and Evaluation reports findings. *Alverno Educators' Newsletter*, Alverno College, June 1983.

Alverno research identifies nurses' abilities. *Forward*, *12*, 1981, pp. 49-50.

Hechinger, F. Women's colleges going strong. *The Milwaukee Journal*, Sunday, May 3, 1981, p. 10.

Earley, M., Mentkowski, M., & Schafer, J. *Valuing at Alverno: The valuing process in liberal education*. Milwaukee, WI: Alverno Productions, 1980.

The Alverno valuing program: Jennifer tells impact of program. *Alverno Today*, Winter, 1980, pp. 4-6.

Mentkowski, M. Creating a "mindset" for evaluating a liberal arts curriculum where valuing is a major outcome. In L. Kuhmerker, M. Mentkowski & V. L. Erickson (Eds.), *Evaluating moral development and evaluating educational programs that have a value dimension*. Schnectady, NY: Character Research Press, 1980.

Valuing Competence Division, Alverno College. *Understanding the student's perceptions of her developing valuing ability: Interviews with "Jennifer" through her college years*. Milwaukee, WI: Alverno Productions, 1980. (Videotape)

Best nurses: Strong, caring. *The Milwaukee Journal*, Sunday, June 15, 1980.

Alverno College Faculty. *Assessment at Alverno College*. Milwaukee, WI: Alverno Productions, 1979.

Alverno awarded NIE grant. *Alverno Today*, Winter, 1979.

Alverno awarded research grant. *The Milwaukee Journal*, November, 1977.

Progress Reports to the National Institute of Education

Mentkowski, M., & Doherty, A. *Careering after college: Establishing the validity of abilities learned in college for later success*. First progress report submitted to the National Institute of Education, February 21, 1978.

Mentkowski, M., & Doherty, A. *Careering after college: Establishing the validity of abilities learned in college for later success*. Second progress report submitted to the National Institute of Education, July 15, 1978.

Mentkowski, M., & Doherty, A. *Careering after college: Establishing the validity of abilities learned in college for later success*. Year-end progress report submitted to the National Institute of Education, January 30, 1979.

Mentkowski, M., & Doherty, A. *Careering after college: Establishing the validity of abilities learned in college for later success*. Mid-year progress report submitted to the National Institute of Education, July 30, 1979.

Mentkowski, M., & Doherty, A. *Careering after college: Establishing the validity of abilities learned in college for later success*. Second year-end progress report submitted to the National Institute of Education, January 30, 1980.

Mentkowski, M., & Doherty, A. *Careering after college: Establishing the validity of abilities learned in college for later success*. Final progress report submitted to the National Institute of Education, September 30, 1980.

Reports to Student, Alumna And Professional Participants

Communications to students took the form of oral presentations and letters throughout their participation in the study. In addition, we provided students with four written reports (In Mentkowski & Strait, 1983, Appendix II); they received a fifth as alumnae (see below).

Mentkowski, M. Changes in student profiles on the Learning Style Inventory. First report to participants in a longitudinal study of college outcomes. Milwaukee, WI: Alverno Productions, 1981.

Mentkowski, M. Understanding the development of thinking in college. Second report to participants in a longitudinal study of college outcomes. Milwaukee, WI: Alverno Productions, 1981.

Mentkowski, M. Some questions and answers about evaluation studies. Third report to participants in a longitudinal study of college outcomes. Milwaukee, WI: Alverno Productions, 1979.

Mentkowski, M., & Fowler, D. Learning to learn at work: Students, alumnae and other professionals. Fourth report to participants in a longitudinal study of college outcomes. Milwaukee, WI: Alverno Productions, 1981.

Alumnae and participants in the professional studies in nursing and management and alumnae studies were mailed reports. Names of institutions are not listed to preserve confidentiality.

Mentkowski, M., DeBack, V., Bishop, J., Allen, Z., & Blanton, B. Developing a professional competence model for nursing education. Milwaukee, WI: Alverno Productions, 1980.

Mentkowski, M., O'Brien, K., McEachern, W., & Fowler, D. Developing a professional competence model for management education. Final report summary for participants, Milwaukee, WI: Alverno Productions, 1983.

Mentkowski, M., Much, N., & Giencke-Holl, L. Careering after college. Fifth progress report to participants in a longitudinal study of college outcomes. Milwaukee, WI: Alverno Productions, 1984.

Presentations to Alverno Faculty, Administrators, Trustees, and Advisory Councils

Communications by the principal investigators to faculty about the rationale for the study, progress reports and results were made through oral presentations, memos, and copies of materials sent to students (Mentkowski & Strait, 1983, Appendix II). Presentations by the Director of Research and Evaluation highlighting particular aspects of the work were made to the corporate faculty at the semester end institutes, and to new faculty each year who were given an overview of the study during New Faculty Orientation. Eight such presentations were made to the total faculty on the purpose, rationale and progress of the research. Thirteen more specific reports were made to various departments or committees in the college. The Director assisted Alverno's Career Development staff to instruct faculty in the use of the behavioral event interviewing technique for a summer, 1982 project to gather information about job abilities as they relate to careers.

Three presentations were made to the Board of Trustees; the first dealt with the results of studies of student perceptions (Fall 1977); the second reported on the purpose, rationale and progress of the study of managers (Spring 1980), the third was made on the major findings (Spring 1984).

There were several reports to advisory councils. They include reports to the Evaluation Advisory Council: October 1978, February 1979, November 1979, June 1980, April 1981, April 1982, and March 1983; and reports to the Management Advisory Council: June 1979, and September 1979. Individual sessions with Advisory Council members were held in 1981, 1982, 1983 and 1984.

Dissemination to Representatives of Institutions Who Visited Alverno

Seminar Days and Workshops at Alverno

An effective form of dissemination to persons outside Alverno occurred at the twenty-three Seminar Days and workshops attended by representatives from 168 colleges, universities (or various departments within those institutions), and other organizations. A review of the list of institutions includes colleges and universities, corporations, and other private and public institutions. Many of these institutions sent a number of representatives to the specialized workshops for college teachers in assessment and valuing, and to Seminar Days. We believe this is an indication that these institutions are interested in improving practice in higher education and are willing to make a long-range commitment.

Seminar Day on High Performance Learning is a one-day session for persons interested in an overview of outcome-centered learning and assessment. Attendees receive a one-hour presentation from the Director of Research and Evaluation on the validation design and the research findings. The Assessment Workshop for College Teachers and the Valuing Workshop for

College Teachers are one-week workshops. In the first, the Director presents an overview and summary; in the second, insights from research efforts are introduced as they apply to various areas under discussion. Materials are distributed to attendees and participants also may select from available reports. Our policy was to initiate and maintain a network of relationships in the research and higher education community to help us adapt methods and develop instruments and procedures to meet the research objectives. Part of this network was created by the contacts made through early dissemination of our efforts.

There were 36 institutions in Wisconsin that participated, which includes 15 of the institutions in higher education in this state. One hundred twenty-four institutions and organizations participated at the national level, and eight at the international level. It was these presentations with questions and discussion that most clearly focused our work, and was the most effective strategy for dissemination. With this final report, we expect to reach a wider variety of audiences who are concerned and committed to the validation and evaluation of higher education programs. The 168 institutions and representative departments to whom we disseminated research outcomes and materials at the state, national, and international level follows (the number following a listing indicates the number of representatives attending).

Institutions Receiving Office of Research and Evaluation
Presentations and Materials at Alverno
Seminar Days and Workshops

1977 to 1984

Wisconsin

Allis Chalmers
Milwaukee, Wisconsin

Appleton Electric Company
South Milwaukee, Wisconsin

Archdiocese of Milwaukee
Milwaukee, Wisconsin

Audubon Middle School
Milwaukee, Wisconsin

Carthage College
Kenosha, Wisconsin

Edgewood College
Madison, Wisconsin

Deerfield School
Deerfield, Wisconsin

Gesu Church
Milwaukee, Wisconsin

Immaculate Heart of Mary Parish (2)
West Allis, Wisconsin

Inroads, Inc.
Milwaukee, Wisconsin

S. C. Johnson & Son, Inc.
Racine, Wisconsin

Marian College of Fond du Lac
Fond du Lac, Wisconsin

Marquette University (3)
Milwaukee, Wisconsin

Medical College of Wisconsin
Milwaukee, Wisconsin

Milwaukee Area Technical College
Milwaukee, Wisconsin

Milwaukee School of Engineering (2)
Milwaukee, Wisconsin

Milwaukee Urban League
Milwaukee, Wisconsin

New Berlin High School
New Berlin, Wisconsin

Northwestern College
Watertown, Wisconsin

Pius XI High School
Milwaukee, Wisconsin

St. Alphonsus School
Greendale, Wisconsin

St. Frederick Parish
Cudahy, Wisconsin

St. Gregory Parish
Milwaukee, Wisconsin

St. Joseph Convent
Milwaukee, Wisconsin

St. Joseph High School
Kenosha, Wisconsin

United Community Center
Milwaukee, Wisconsin

University of Wisconsin - Green Bay
Green Bay, Wisconsin

University of Wisconsin - Madison
Madison, Wisconsin

University of Wisconsin - Milwaukee (3)
Milwaukee, Wisconsin

University of Wisconsin - Oshkosh (2)
Oshkosh, Wisconsin

University of Wisconsin - Parkside
Kenosha, Wisconsin

University of Wisconsin - Platteville (2)
Platteville, Wisconsin

University of Wisconsin - Whitewater
Whitewater, Wisconsin

Washington High School
Milwaukee, Wisconsin

Wisconsin Lutheran High School
Milwaukee, Wisconsin

Wisconsin State Council on Economic
Education
Milwaukee, Wisconsin

National

A Consultation Consortium for
Organizational Development
Vernon Hills, Illinois

Alaska Department of Education
Juneau, Alaska

Alaska Pacific University
Anchorage, Alaska

Alvernia High School (2)
Chicago, Illinois

Anna Marie College
Paxton, Massachusetts

Association of Catholic Colleges
and Universities
Washington, D.C.

Baldwin-Wallace College (3)
Berea, Ohio

Barat College (2)
Lake Forest, Illinois

Barry College
Miami Shores, Florida

Bay de Noc Community College
Escanaba, Michigan

Bellevue College (2)
Bellevue, Nebraska

Bellmont College
Nashville, Tennessee

Bendix Corporation
Southfield, Michigan

Bethel College
St. Paul, Minnesota

Brigham Young University
Provo, Utah

Capital University
Columbus, Ohio

Capital University
University Without Walls Program
Columbus, Ohio

Carlow College
Pittsburgh, Pennsylvania

Catholic University of America
School of Education
Hyattsville, Maryland

Cedar Crest College
Allentown, Pennsylvania

The Center for New Television
Chicago, Illinois

Chapman College
Orange, California

Clayton Junior College
Morrow, Georgia

College IV, Grand Valley
State Colleges
Allendale, Michigan

College of Lake County
Grayslake, Illinois

College of New Rochelle
New Rochelle, New York

College of St. Benedict (3)
St. Joseph, Minnesota

College of St. Mary (2)
Omaha, Nebraska

College of St. Scholastica
Duluth, Minnesota

College of St. Theresa
Winona, Minnesota

The Cooper Union, Cooper Square (2)
New York, New York

Creighton University (2)
Omaha, Nebraska

C. W. Post College (2)
Greenvale, New York

Cuyahoga Community College (2)
Parma, Ohio

Delgado College
New Orleans, Louisiana

Denison University
Granville, Ohio

DePaul University
Chicago, Illinois

Dominican High School
Omaha, Nebraska

Donnelly College
Kansas City, Kansas

Eastern Connecticut State University
Willimantic, Connecticut

Elizabethtown College (2)
Elizabethtown, Pennsylvania

El Paso Community College
El Paso, Texas

Empire State College
Old Westbury, New York

Findlay College
Findlay, Ohio

Flaming Rainbow University
Tahlequah, Oklahoma

Florida A & M University
Tallahassee, Florida

Florida State University (2)
Tallahassee, Florida

The Frank Lloyd Wright Foundation
Frank Lloyd Wright School of Architect
Scottsdale, Arizona

Franklin University
Columbus, Ohio

Governors State College (2)
Park Forest South, Illinois

Harris-Stowe College (4)
St. Louis, Missouri

Holy Name College
Oakland, California

Housatonic Community College
Bridgeport, Connecticut

Hudson Valley Community College
Troy, New York

Illinois Institute of Technology
Chicago, Illinois

Illinois State University (2)
Normal, Illinois

Indiana Institute of Technology
Fort Wayne, Indiana

Iowa Lakes Community College
Estherville, Iowa

John Brown University
Siloam Springs, Arkansas

Joliet Junior College
Joliet, Illinois

Kamehameha Schools (2)
Honolulu, Hawaii

Kapiolani Community College (2)
Honolulu, Hawaii

Kentucky State University
Frankfurt, Kentucky

King's College
Wilkes-Barre, Pennsylvania

Kirkhof College (2)
Grand Valley State Colleges
Allendale, Michigan

Kirkwood Community College
Cedar Rapids, Iowa

Lesley College (2)
Cambridge, Massachusetts

Loyola University
Chicago, Illinois

Mars Hill College
Mars Hill, North Carolina

Mary College (7)
Bismark, North Dakota

Marywood College
Scranton, Pennsylvania

McKendree College
Lebanon, Illinois

Medgar Evers College
Brooklyn, New York

Memphis State University
Memphis, Tennessee

Mercer University in Atlanta
Atlanta, Georgia

Metropolitan College (3)
Minneapolis, Minnesota

Metropolitan State College (4)
St. Paul, Minnesota

Miami-Dade Community College (2)
Miami, Florida

Michigan State University (2)
Justin Morrill College
East Lansing, Michigan

Mid-Plains Community College
North Platte, Nebraska

Minneapolis Community College
Minneapolis, Minnesota

Mount Marty College
Yankton, South Dakota

Naperville Community School District #203
Naperville, Illinois

Naperville North High School
Naperville, Illinois

Nazareth College of Rochester
New York, New York

New York Society for Ethical
Culture Schools (2)
New York, New York

North Adams State College (2)
North Adams, Massachusetts

Northeastern Illinois University
Chicago, Illinois

Northeastern University (4)
Boston, Massachusetts

Northwest Alabama State Junior College
Phil Campbell, Alabama

Northwest Regional Educational Laboratory
Portland, Oregon

Northwestern University
Evanston, Illinois

Nova College
Fort Lauderdale, Florida

Office of Catholic Education
Chicago, Illinois

Otterbein College
Westerville, Ohio

Our Lady of Angels College
Aston, Pennsylvania

Our Lady of the Lake University
San Antonio, Texas

Park College
Parkville, Missouri

Pennsylvania State University
University Park, Pennsylvania

Rhode Island College (2)
Providence, Rhode Island

Rock Valley College
Rockford, Illinois

St. John's University
Collegeville, Minnesota

St. Leo College
St. Leo, Florida

St. Louis University School of
Business (2)
St. Louis, Missouri

St. Mary of Celle Parish
Berwyn, Illinois

St. Mary's College of Maryland
St. Mary's City, Maryland

St. Xavier College
Chicago, Illinois

Spartanburg Technical College
Spartanburg, South Carolina

Trenton State College
Trenton, New Jersey

Tri County Technical College
Pendleton, South Carolina

Trinity Christian College
Palos Heights, Illinois

Trinity College
Washington, D.C.

University of Evansville (2)
Evansville, Indiana

University of Minnesota
School of Denistry (2)
Minneapolis, Minnesota

University of Oklahoma
Norman, Oklahoma

Ursinus College
Collegeville, Pennsylvania

Voorhees College (3)
Denmark, South Carolina

Waldorf College
Forest City, Iowa

Walter Sundling Junior High
School
Palatine, Illinois

Washington International College
Washington, D.C.

West Oahu College (2)
Aihea, Hawaii

Wharton County Junior College
Wharton, Texas

William Rainey Harper College (4)
Palatine, Illinois

Wright Institute (2)
Berkeley, California

International

Brock University
St. Catharines
Ontario, Canada

Georgian College of Applied Arts and Technology
Orillia, Ontario, Canada

Inter-American University of Puerto Rico
San Juan, Puerto Rico

Pontificia Universidad Javeriana
Faculty Interdisciplinary Studies
Bogota, Columbia, South America

Sheridan College of Applied Arts and Technology (2)
Oakville, Ontario, Canada

Southwest London College
Center for Higher Business Studies
London, England

University of Puerto Rico
San Juan, Puerto Rico

University of Puerto Rico at Rio Piedras
Guynabo, Puerto Rico

Dissemination Through Mailed Materials

Persons from a range of institutions have written to us for further information, and we have responded by sending materials that related to their efforts.

In September, 1980, 4500 copies of Valuing at Alverno: The Valuing Process in Liberal Education (Earley, Mentkowski & Schafer, 1980), which contains extensive references to the NIE funded research to validate Alverno's curriculum, were mailed to values educators and to academic deans in higher education across the country. The publication of Analysis and Communication at Alverno: An Approach to Critical Thinking (Loacker, Cromwell, Fey & Rutherford, 1984), disseminated in 1984, contains references to the research findings.

The following 207 institutions and representative departments received materials.

Institutions Receiving Requested Office of Research and Evaluation Materials

1977 to 1984

Wisconsin

Cardinal Stritch College
Milwaukee, Wisconsin

Department of Public Instruction
Madison, Wisconsin

Marquette University
Department of Psychology
Milwaukee, Wisconsin

Milwaukee School of Engineering
Milwaukee, Wisconsin

Newspapers Inc.
The Milwaukee Journal
Milwaukee, Wisconsin

St. Luke's Hospital
Milwaukee, Wisconsin

St. Michael Hospital
Milwaukee, Wisconsin

St. Norbert College
DePere, Wisconsin

University of Wisconsin - Madison
Madison, Wisconsin

University of Wisconsin - Oshkosh
Oshkosh, Wisconsin

University of Wisconsin - Superior
Superior, Wisconsin

Viterbo College
LaCrosse, Wisconsin

National

Abt Associates, Inc.
Cambridge, Massachusetts

Adelphi University
School of Nursing
Garden City, New York

Alaska Pacific University
Continuing Education Department
Anchorage, Alaska

Albertus Magnus College
New Haven, Connecticut

American Anthropological Association
Washington, D.C.

American College Testing (ACT)
Iowa City, Iowa

The American Registry of Radiological
Technologists
Minneapolis, Minnesota

Anheuser-Busch, Inc.
Corporate Brewing Operations
St. Louis, Missouri

Arizona Department of Education
Phoenix, Arizona

Arizona State University
Instructional Design
University Media Systems
Tempe, Arizona

Association of Catholic College and
Universities
Washington, D.C.

Augustana College/Sioux Falls College
Sioux Falls, South Dakota

Ball State University
Career Information Services
Muncie, Indiana

Ball State University
Teachers College
Burris Laboratory School
Muncie, Indiana

Boston College
Chestnut Hill, Massachusetts

Bowling Green State University
Bowling Green, Ohio

Brigham Young University
Provo, Utah

Bronx Community College
City University of New York
Bronx, New York

Bryn Mawr College
Bryn Mawr, Pennsylvania

CCC Mastery Learning Project
Chicago, Illinois

Calvin College
Grand Rapids, Michigan

Career Information System
Eugene, Oregon

Center for Applications of
Developmental Instruction
College Park, Maryland

Central Michigan University
Mount Pleasant, Michigan

Chapman College
Orange, California

Chicago Public Schools
Department of Curriculum
Chicago, Illinois

The Chronicle of Higher Education
Washington, D.C.

Claremount Graduate School
Claremount, California

Clayton Junior College
Humanities Division
Morrow, Georgia

The College of Idaho
Caldwell, Idaho

College of St. Benedict
St. Joseph, Minnesota

College of St. Benedict
Nursing Department
St. Joseph, Minnesota

College of St. Scholastica
Duluth, Minnesota

College of St. Theresa
Winona, Minnesota

Concert Management
Falls Church, Virginia

Coppin State College
Baltimore, Maryland

Cornell University
Field Study Office
New York, New York

Cornell University
Human Development and Family Studies
Ithaca, New York

Columbia University
Teachers College
New York, New York

Davidson College
Davidson, North Carolina

Delaware County Community College
Media, Pennsylvania

Department of Professional Regulation
Tallahassee, Florida

DePaul University
School for New Learning
Chicago, Illinois

Eastern Oregon State College
LaGrande, Oregon

The Edu-Caring Foundation
Resources for Human Development
Ardmore, Pennsylvania

The Ethical Culture Schools
New York, New York

Fairhaven College
Bellingham, Washington

Forest Service
Washington, D.C.

Franklin University
Columbus, Ohio

Fund for the Improvement
of Post-Secondary Education
Washington, D.C.

Gallaudet College
Department of Education
Washington, D.C.

George Meany Center for Labor
Studies, Inc.
Tripartite Program for Apprenticeship and
Associate Degree in Labor Studies
Silver Spring, Maryland

George Washington University
Washington, D.C.

State of Georgia
Department of Offender Rehabilitation
Assessment and Management Development
Atlanta, Georgia

Governors State University
Division of Communication and Human
Services
Park Forest South, Illinois

Grand View College
Des Moines, Iowa

Hamline University
St. Paul, Minnesota

Harvard University
Cambridge, Massachusetts

Harvard University
Bureau of Study Counsel
Cambridge, Massachusetts

Harvard University
Center for Moral Education
Cambridge, Massachusetts

Harvard University
Harvard School of Dental Medicine
Boston, Massachusetts

Haverford College
Haverford, Pennsylvania

Higher Education Daily
Washington, D.C.

Hunter College
Division of Programs in Education
Program for Gifted Youth
New York, New York

Illinois State University
Department of Curriculum and Instruction
Normal, Illinois

Indiana University
School of Nursing
Indianapolis, Indiana

The Institute for Community Service
Public Service Fellows Program
Freeport, Maine

Institute for Studies in Educational
Mathematics
St. Paul, Minnesota

International Business Machines
Corporation (IBM)
Armonk, New York

International Public Policy Research
Corporation
McLean, Virginia

Iowa Regents Universities
Interinstitutional Programs
Iowa City, Iowa

Long Island University
A & M Schwartz College of Pharmacy
and Health Sciences
Brooklyn, New York

Long Island University
C. W. Post Center
Greenvale, New York

Loretto Heights College
University Without Walls
Denver, Colorado

Loyola University
Chicago, Illinois

McBer and Company
Boston, Massachusetts

McKay-Dee Hospital Center
Center for Counseling and Therapeutic
Services
Ogden, Utah

Memphis State University
College of Education
Memphis, Tennessee

Miami University
Psychology Department
Oxford, Ohio

Michigan State University
Institute for Research on Teaching
East Lansing, Michigan

Mills College
Oakland, California

Montana State University
Bozeman, Montana

Moorhead State
Psychology Department
Moorhead, Minnesota

Moraine Valley Community College
Office of Institutional Research
Palos Hills, Illinois

Mount Aloysius Junior College
Cresson, Pennsylvania

Mutual of Omaha Insurance Company
Omaha, Nebraska

National Evaluation Systems, Inc.
Amherst, Massachusetts

The National Judicial College
University of Nevada
Reno, Nevada

New York State Education Department
Albany, New York

The New York Times
New York, New York

Newsweek Magazine
New York, New York

The North Carolina School of Science
and Mathematics
Durham, North Carolina

Northern Illinois University
Department of Philosophy
DeKalb, Illinois

Northern Illinois University
School of Allied Health Professions
DeKalb, Illinois

Northern Virginia Community College
Extended Learning Institute
Annandale, Virginia

Northwestern University
Evanston, Illinois

Northwestern University
Center for the Teaching Professions
Evanston, Illinois

Ohio State University
Department of Psychology
Columbus, Ohio

Ohio State University
National Center for Research in
Vocational Education
Columbus, Ohio

Oklahoma State University
Stillwater, Oklahoma

Oregon Institute of Technology
Klamath Falls, Oregon

Organizational Assessment and
Development
McLean, Virginia

Organizational Systems, Inc.
San Diego, California

Peabody College of Vanderbilt University
Nashville, Tennessee

Prince George's Community College
Largo, Maryland

Regents External Degrees
Cultural Education Center
Albany, New York

Richland College
Student Services
Dallas, Texas

Roberts Wesleyan College
Rochester, New York

Rochester Institute of Technology
Department of Educational Research
and Development
Rochester, New York

Rochester Institute of Technology
National Technical Institute for the Deaf
Rochester, New York

St. John's University
Collegeville, Minnesota

St. Louis University Medical Center
Department of Health Education
St. Louis, Missouri

St. Peter's College
Jersey City, New Jersey

St. Olaf College
Office of Educational Research
Northfield, Minnesota

San Jose State University
Community Outreach Options for RN's
San Jose, California

Search Institute
Minneapolis, Minnesota

Seton Hall University
South Orange, California

Sonoma State University
Rohnert Park, California

Southern Illinois University at Carbondale
Carbondale, Illinois

Stephens College
Placement Office
Columbia, Missouri

Stockton State College
Pomona, New Jersey

Swarthmore College
Swarthmore, Pennsylvania

Syracuse University
College of Education
Syracuse, New York

Syracuse University
Division of Educational Foundations
School of Education
Syracuse, New York

Teaching Research
A Division of the Oregon State
System of Higher Education
Monmouth, Oregon

Texas Tech University
School of Nursing
Health Sciences Center
Lubbock, Texas

Time Magazine
Washington, D.C.

Tri County Technical College
Pendleton, South Carolina

U.S. Military Academy
Institutional Research Office
West Point, New York

Union College
Department of Psychology
Schenectady, New York

The Union for Experimenting Colleges
and Universities
Cincinnati, Ohio

United Press International (UPI)
New York, New York

University of Alabama
Office of Educational Development
Birmingham, Alabama

University of California - Davis
University Medical Center
Family Nurse Practitioner Program
Sacramento, California

University of California - Los Angeles
Los Angeles, California

University of Cincinnati
College of Design, Architecture, Art,
and Planning
School of Planning
Cincinnati, Ohio

University of Colorado
College of Letters, Arts and Sciences
Colorado Springs, Colorado

University of Georgia
Department of Psychology
Athens, Georgia

University of Hartford
West Hartford, Connecticut

University of Illinois at Chicago
College of Education
Chicago, Illinois

University of Iowa
Iowa City, Iowa

University of Kentucky
Department of Higher Education
Lexington, Kentucky

University of Maryland
College of Education
College Park, Maryland

University of Maryland
Counseling Center
College Park, Maryland

University of Maryland
Department of Psychology
College Park, Maryland

University of Maryland
Experiential Learning Program
Hornbake Library
College Park, Maryland

University of Massachusetts
Department of Education and Psychology
Amherst, Massachusetts

University of Michigan
Department of Psychology
Ann Arbor, Michigan

University of Michigan
School of Dentistry
Ann Arbor, Michigan

University of Michigan
School of Education
Ann Arbor, Michigan

University of Minnesota
Minneapolis, Minnesota

University of Minnesota
School of Dentistry
Minneapolis, Minnesota

University of Minnesota - Morris
Morris, Minnesota

University of Missouri - Rolla
Counseling Center
Rolla, Missouri

University of Notre Dame
Notre Dame, Indiana

University of North Dakota
Office of Instructional Development
Grand Forks, North Dakota

University of Oklahoma
Norman, Oklahoma

University of the Pacific
College of Arts and Sciences
Stockton, California

University of the Pacific
Department of Philosophy
Stockton, California

The University of Rochester
School of Medicine and Dentistry
Division of Medical Education
Rochester, New York

University of South Florida
College of Education
Psychological and Social Foundations
Department
Tampa, Florida

University of Utah
Graduate School of Education
Salt Lake City, Utah

University of Vermont
Burlington, Vermont

University of Washington
Seattle, Washington

University System of New Hampshire -
Dunlop Center
Durham, New Hampshire

U.S. News and World Report
Washington, D.C.

USA Today
Washington, D.C.

Vanderbilt University
Institute for Public Policy Studies
Nashville, Tennessee

The Wall Street Journal
New York, New York

Washington University
Graduate Institute of Education
St. Louis, Missouri

Weber State College
Ogden, Utah

Wellesley College
Department of Psychology
Wellesley, Massachusetts

Whitman College
Walla Walla, Washington

The Wright Institute
Berkeley, California

International

Australian National University
Office for Research in Academic Methods
South Bentley, Western Australia, Australia

Bayamon Technological University College
Department of Biology
Bayamon, Puerto Rico

Ben Gurion University
School of Medicine
Beer Sheva, Israel

Deutsches Institut Fur Fernstudien
An Der Universitat Tubingen
Tubingen 1, West Germany

Erasmus Universiteit Rotterdam
Rotterdam, Holland, Netherlands

McGill University
Centre for Teaching and Learning Services
Montreal, Quebec, Canada

McGill University
Faculty of Education
Montreal, Quebec, Canada

McMaster University
Department of Chemical Engineering
Hamilton, Ontario, Canada

Mount Saint Vincent University
Halifax, Nova Scotia, Canada

National University of Lesotho
Institute of Education
Lesotho, Africa

Pontificia Universidad Javeriana
Faculty Interdisciplinary Studies
Bogota', Columbia, South America

St. Clair College
Applied Research Centre
Windsor, Ontario, Canada

University of British Columbia
Faculty of Education
Vancouver, British Columbia, Canada

University of Ottawa
School of Nursing
Ottawa, Canada

University of Puerto Rico
General Education College
Physical Science Department
Rio Piedras, Puerto Rico

University of Quebec-Montreal
Sciences De L'Education
Montreal, Quebec, Canada

University of Regina
Regina, Saskatchewan, Canada

University of the Sacred Heart
Sacturce, Puerto Rico

University of Waterloo
Waterloo, Ontario, Canada

Western Australian Institute of Technology
South Bentley, Western Australia, Australia

York University
Educational Development Office
Downsview, Ontario, Canada

Materials Disseminated at Off-Campus Conferences and Seminars

This final dissemination list consists of institutions that were represented (when registrant lists were available) at the 35 off-campus meetings, conferences and workshops at which Office of Research and Evaluation members presented. We recorded 510 institutions and representative departments as having received dissemination materials at these conferences.

State, National and International Institutions Receiving Office of Research and Evaluation Presentations and Materials at Off-Campus Conferences and Workshops

1977 to 1984

Wisconsin

Beloit College
Beloit, Wisconsin

Edgewood College
Madison, Wisconsin

Johnson Controls, Inc.
Milwaukee, Wisconsin

S. C. Johnson & Son, Inc.
Racine, Wisconsin

Marquette University
Milwaukee, Wisconsin

University of Wisconsin - Eau Claire
Eau Claire, Wisconsin

University of Wisconsin - Green Bay
Green Bay, Wisconsin

University of Wisconsin - Madison
Madison, Wisconsin

University of Wisconsin - Milwaukee
Milwaukee, Wisconsin

University of Wisconsin - Parkside
Kenosha, Wisconsin

University of Wisconsin - Stevens Point
Stevens Point, Wisconsin

University of Wisconsin - Whitewater
Whitewater, Wisconsin

National

Abraham Baldwin Agricultural College
Tifton, Georgia

Addison School District
Addison, Illinois

Advanced Research Resources Organization
Bethesda, Maryland

Albertson's, Inc.
Boise, Idaho

City of Alexandria
Alexandria, Virginia

Alvin Community College
Alvin, Texas

American Association for Higher Education
Washington, D.C.

American Association of Colleges for
Teacher Education
Washington, D.C.

American Association of School Administrators
Arlington, Virginia

American Association of University Professors
Washington, D.C.

American Cast Iron Pipe Company
Birmingham, Alabama

The American College Testing Program (ACT)
Iowa City, Iowa

American Council on Education
ACE Fellows in Academic Administration
Washington, D.C.

American Council on Education
Division of Academic Affairs and
Insititutional Relations
Washington, D.C.

American Council on Education
Office of Women in Higher Education
Washington, D.C.

American Forest Institute
Washington, D.C.

American Telephone & Telegraph (AT&T)
Basking Ridge, New Jersey

American University
Arlington, Virginia

Anderson College
Anderson, Indiana

Anheuser-Busch Companies, Inc.
Corporate Brewing
St. Louis, Missouri

Anheuser-Busch, Inc.
Baldwinsville, New York

Anheuser-Busch, Inc.
Williamsburg, Virginia

Antioch Volunteer Services
Mt. Rainier, Maryland

Aquinas College
Grand Rapids, Michigan

Arco Oil & Gas
Dallas, Texas

Assessment Designs, Inc.
Orlando, Florida

Assessment & Development Associates
Lakewood, Ohio

Association of American Colleges
Washington, D.C.

The Athena Corporation
Bethesda, Maryland

Atlantic Christian College
Wilson, North Carolina

Atlantic Richfield Company
Los Angeles, California

Auburn University at Montgomery School
of Business
Department of Management and Marketing
Montgomery, Alabama

Austin College
Sherman, Texas

Automobile Club of Michigan
Dearborn, Michigan

AWC/EDRC
Maxwell Air Force Base, Alabama

Baldwin-Wallace College
Berea, Ohio

Ball State University
Muncie, Indiana

Ball State University
Whitinger College of Business
Muncie, Indiana

Baltimore Gas & Electric Company
Baltimore, Maryland

Bankers Trust Company
New York, New York

Barry University
Miami, Florida

Baylor University
Waco, Texas

Bell System Center for Technical Ed
Lisle, Illinois

Belleville Area College
Belleville, Illinois

Bennett College
Greensboro, North Carolina

Berea College
Berea, Kentucky

L. M. Berry and Company
Dayton, Ohio

Blue Cross of Massachusetts, Inc.
Boston, Massachusetts

Board of Police Commissioners
Kansas City, Missouri

Boise State University
Boise, Idaho

Bowling Green State University
Bowling Green, Ohio

Bowling Green State University
College of Education
Bowling Green, Ohio

Bowling Green State University
EDFI Department
Bowling Green, Ohio

Bradley University
Peoria, Illinois

Brigham Young University
Provo, Utah

Brigham Young University
Physical Education Advisement Center
Provo, Utah

California State University - Fullerton
Fullerton, California

California State University and Colleges
Systems Office
Long Beach, California

Calvin College
Grand Rapids, Michigan

Cameron University
Lawton, Oklahoma

Canisius College
Buffalo, New York

Capital University Without Walls
Dayton, Ohio

Carnegie Corporation of New York
New York, New York

Carrier Corporation
Syracuse, New York

Case Western Reserve University
Cleveland, Ohio

Case Western Reserve University
Case Institute of Technology
Cleveland, Ohio

Case Western Reserve University
School of Organizational Behavior
Cleveland, Ohio

Case Western Reserve University
Weatherhead School of Management
Cleveland, Ohio

Cantonsville Community College
Allentown, Pennsylvania

Cedar Crest College
Allentown, Pennsylvania

Center for Environmental Education and
Instructional Services
Fort Myers, Florida

Center for Personnel Research and Development
Office of Personnel Management
Washington, D.C.

Central Missouri State University
Warrensburg, Missouri

Central State University
Edmond, Oklahoma

Chapman College
Orange, California

Cheltenham School District
Elkins Park, Pennsylvania

Chicago State University
Chicago, Illinois

Christian Brothers College
Memphis, Tennessee

CIBA Pharmaceutical Company
Summit, New Jersey

Claflin College
Orangeburg, South Carolina

Barry M. Cohen & Associates
Largo, Florida

The College Board - Washington Office
Washington, D.C.

College of Mount Saint Vincent
Riverdale, New York

College of New Rochelle
New Rochelle, New York

College of St. Benedict
St. Joseph, Minnesota

The College of St. Catherine
St. Paul, Minnesota

College of St. Francis
Joliet, Illinois

College of St. Scholastica
Duluth, Minnesota

The College of Wooster
Wooster, Ohio

Colorado School of Mines
Golden, Colorado

Community Women's Education Project
Philadelphia, Pennsylvania

Concordia College
River Forest, Illinois

Conference Design & Management
Washington, D.C.

Constortium for the Advancement of
Private Higher Education
Washington, D.C.

Cooper Union
New York, New York

Coro Foundation
New York, New York

Corporation for Public Broadcasting
Annenburg Project
Washington, D.C.

Corporation for Public Broadcasting
Washington, D.C.

Cottey College
Nevada, Missouri

Council for the Advancement of
Experiential Learning
Columbia, Maryland

CUNY
New York, New York

Dade County Public Schools
Miami, Florida

Dade Miami Criminal Justice Assessment Center
Hialeah, Florida

Defense Equal Opportunity Management Institute
Patrick Air Force Base, Florida

DePaul University
Chicago, Illinois

DePaul University
College of Arts and Sciences
Chicago, Illinois

DePaul University
College of Arts and Sciences
Chicago, Illinois

D.C. Office of Personnel
Washington, D.C.

Development Dimensions International
Pittsburgh, Pennsylvania

Dickens College
Carlisle, Pennsylvania

Drew University
Madison, New Jersey

Dundalk Community College
Baltimore, Maryland

East Central College
Union, Missouri

East Tennessee State University
College of Arts and Sciences
Johnson City, Tennessee

Eastern Illinois University
Charleston, Illinois

Eastern Kentucky University
Richmond, Kentucky

Eastern Washington University
Cheney, Washington

Edison State Community College
Piqua, Ohio

Edson Associates
Rancho Palos Verdes, California

Educational Testing Service
Berkeley, California

Educational Testing Service
Washington, D.C.

Educational Testing Service
Princeton, New Jersey

Elgin School District U-46
Elgin, Illinois

Excel, Inc.
Clarksville, Arkansas

Excel, Inc.
Oak Brook, Illinois

Federal Aviation Administration
Washington, D.C.

Florida International University
Miami, Florida

Florida Power Corporation
St. Peterburg, Florida

Florida State University
Tallahassee, Florida

Fontbonne College
St. Louis, Missouri

Ford Foundation
New York, New York

Ford Motor Company
Detroit, Michigan

Franklin Pierce College
Rindge, New Hampshire

Franklin University
Columbus, Ohio

Front Range Community College
Westminster, Colorado

Fund for the Improvement of
Post-Secondary Education
Washington, D.C.

General Dynamics
Electric Boat Division
Groton, Connecticut

General Motors Corporation
Detroit, Michigan

General Motors Corporation
Fisher Body Division
Warren, Michigan

General Motors Corporation
GM Assembly Division
Warren, Michigan

George Mason University
Fairfax, Virginia

Georgia Department of Offender Rehab
Atlanta, Georgia

Georgia Southern College
Statesboro, Georgia

Glenbrook North High School
Northbrook, Illinois

Gordon College
Wenham, Massachusetts

Governors State University
Park Forest South, Illinois

Grand View College
Des Moines, Iowa

Gustavus Adolphus College
St. Peter, Minnesota

Halifax Community College
Weldon, North Carolina

Harding University
College of Arts and Sciences
Searcy, Arkansas

Harvard University
Harvard Graduate School of Education
Cambridge, Massachusetts

Heidelberg College
Tiffin, Ohio

The Hertz Corporation
Oklahoma City, Oklahoma

Holland, Jennings, & Talbot, Inc.
Evanston, Illinois

Hood College
Frederick, Maryland

Hope College
Holland, Michigan

Houghton College
Houghton, New York

City of Houston
Houston, Texas

Houston Baptist University
Houston, Texas

Human Resources International
San Diego, California

Illinois Benedictine College
Lisle, Illinois

Illinois Center for Educational Improvement
Arlington Heights, Illinois

Illinois Institute of Technology
Chicago, Illinois

Illinois State University
Normal, Illinois

Indiana University
Bloomington, Indiana

Indiana University
Business Placement Office
Bloomington, Indiana

Indiana University
School of Business
Bloomington, Indiana

Indiana University
Fort Wayne, Indiana

Indiana University
Indianapolis, Indiana

Indiana University
Terre Haute, Indiana

Indiana University of Pennsylvania
Indiana, Pennsylvania

Indiana University - Purdue University
Fort Wayne, Indiana

Indiana University - Purdue University
Indianapolis, Indiana

Indiana University Southeast
New Albany, Indiana

International Business Machines Corporation
Armonk, New York

International Business Machines Corporation
Gaithersburg, Maryland

IBM - IFPA - PACE
Armonk, New York

International College
New York, New York

Iowa State University
Ames, Iowa

Iowa State University
Department of Physics
Ames, Iowa

Jefferson College
Hillsboro, Missouri

Jefferson Community College
Louisville, Kentucky

Jefferson County Schools
Louisville, Kentucky

John Carroll University
University Heights, Ohio

Johnson County Community College
Overland Park, Kansas

Jossey-Bass Publishing Company
Washington, D.C.

Kansas City Power & Light
Kansas City, Missouri

Kansas Newman College
Wichita, Kansas

Kansas State University
Manhattan, Kansas

Kansas State University
College of Administration
Manhattan, Kansas

Kent State University
College of Arts and Sciences
Kent, Ohio

King's Academy
Winthrop Harbor, Illinois

Kroger Company
Corporate Office
Cincinnati, Ohio

Kroger, Inc.
Atlanta, Georgia

The Learning Center
San Francisco, California

Lewis & Clark Community College
Godfrey, Illinois

Lincoln Land Community College
Springfield, Illinois

Lisle District 202
Lisle, Illinois

Lombard Public Schools
Glen Ellyn, Illinois

Lopes Assessment Services, Inc.
Port Washington, New York

Loretto Heights College
Denver, Colorado

Los Angeles Unified School District
Los Angeles, California

Loyola University
School of Denistry
Maywood, Illinois

Loyola University
School of Law
Chicago, Illinois

Lycoming College
Williamsport, Pennsylvania

Madison Local Schools
Mansfield, Ohio

Mainstream Access, Inc.
Johnstown, Pennsylvania

Mankato State University
Mankato, Minnesota

Marriott Corporation
Washington, D.C.

Mary Holmes College
West Point, Mississippi

Marycrest College
Davenport, Iowa

The Maryland Institute
Baltimore, Maryland

Marymount Manhattan College
New York, New York

F. M. McIntyre & Associates
Bloomfield Hills, Michigan

Mead Johnson & Company
Evansville, Indiana

Memphis State University
Memphis, Tennessee

Memphis State University
Center for the Study of Higher Education
Memphis, Tennessee

Memphis State University
College of Education
Memphis, Tennessee

Mercy College of Detroit
Detroit, Michigan

Messiah College
Grantham, Pennsylvania

Metropolitan Police Department
Washington, D.C.

Metropolitan State University
St. Paul, Minnesota

Metropolitan Technical Community College
Omaha, Nebraska

Miami Dade Community College
Miami, Florida

Miami University
Oxford, Ohio

Miami University - Hamilton
Hamilton, Ohio

Michigan Municipal League
Ann Arbor, Michigan

Michigan State University
East Lansing, Michigan

Midlands Technical College
Columbia, South Carolina

Mississippi State University
Mississippi State, Mississippi

Montgomery County Government
Rockville, Maryland

Moraine Valley Community College
Palos Hills, Illinois

Morgan State University
Baltimore, Maryland

Mt. Hood Community College
Gresham, Oregon

Mt. Marty College
Yankton, South Dakota

Mt. St. Mary's College
Los Angeles, California

Mt. Vernon Nazarene College
Mt. Vernon, Ohio

Mutual of Omaha
Omaha, Nebraska

Nash Technical College
Rocky Mount, North Carolina

National Association of State Universities
and Land Grant Colleges
Washington, D.C.

National College of Education
Downers Grove, Illinois

National Congress of Neighborhood Women
Brooklyn, New York

National Endowment for the Humanities
Washington, D.C.

National Institute of Education
Washington, D.C.

National Science Foundation
Washington, D.C.

Nationwide Insurance Company
Columbus, Ohio

Nazareth College of Rochester
Rochester, New York

New Church College
Bryn Athyn, Pennsylvania

New Hampshire College
Manchester, New Hampshire

New Hope Pain Center
Alhambra, California

New York Power Authority
New York, New York

New York University
New York, New York

North Carolina Central University
Durham, North Carolina

North Carolina State University
Raleigh, North Carolina

North Hennepin Community College
Minneapolis, Minnesota

North Idaho College
Coeur d'Alene, Idaho

North Illinois Gas
Aurora, Illinois

North Park College
Chicago, Illinois

North Texas State University
Denton, Texas

Northeast Missouri State University
Kirksville, Missouri

Northeastern Illinois University
Chicago, Illinois

Northern Illinois University
DeKalb, Illinois

Northern Illinois University
College of Professional Studies
DeKalb, Illinois

Northern Kentucky University
Department of Education
Highland Heights, Kentucky

Northwestern University
Evanston, Illinois

Northwestern University
School of Education
Evanston, Illinois

Nova College
Fort Lauderdale, Florida

Oakland Unviersity
Rochester, Michigan

Oakland University
College of Arts and Sciences
Rochester, Michigan

Office of Management and Budget
Washington, D.C.

Office of Personnel Management
Washington, D.C.

Ohio Medical Indemnity Mutual
Worthington, Ohio

Ohio State University
Columbus, Ohio

Ohio State University College
Columbus, Ohio

Ohio State University - Mansfield
Mansfield, Ohio

Oklahoma State University
Stillwater, Oklahoma

Old Dominican University
Norfolk, Virginia

O'Leary, Brokaw & Associates
Clayton, Missouri

Olivet Nazarene College
Kankakee, Illinois

Olympic Community Unit
Standford, Illinois

Organizational Assessment
and Development
McLean, Virginia

Owens Corning Fiberglass
Toledo, Ohio

Paine College
Augusta, Georgia

Pennsylvania State University
Division of Undergraduate Studies
Altoona, Pennsylvania

Pennsylvania State University
University Park, Pennsylvania

Philip Morris U.S.A.
Richmond, Virginia

Phoenix College
Phoenix, Arizona

Phoenix Mutual Life
Hartford, Connecticut

Piedmont Virginia Community College
Charlottesville, Virginia

Pine Manor College
Chestnut Hill, Massachusetts

Pocono Environmental Education Center
Dingsman Ferry, Pennsylvania

Point Loma College
San Diego, California

Port Authority of New York & New Jersey
New York, New York

Principia College
Elsah, Illinois

Public Broadcasting Service
Washington, D.C.

Purdue University
West Lafayette, Indiana

Purdue University
School of Pharmacy
West Lafayette, Indiana

Purdue University - Calumet
Hammond, Indiana

Radford University
Radford, Virginia

Raymond Wallters College
Cincinnati, Ohio

Regis College
Denver, Colorado

Rend Lake College
Ina, Illinois

4th Reserve Officers Training Corps
Fort Lewis, Washington

Reserve Officers Training Corps
Fort Monroe, Virginia

City of Richmond
Richmond, Virginia

The Robert R. Moton Memorial Institute
Glouseater, Virginia

Rock Island Arsenal
Rock Island, Illinois

Rockford College
Rockford, Illinois

Roosevelt University
Chicago, Illinois

Rosemont College
Rosemont, Pennsylvania

Ross Labs
Columbus, Ohio

Safeway Stores, Inc.
Oakland, California

St. Edward's University
Austin, Texas

St. Francis College
Loretto, Pennsylvania

St. John's University - Collegeville
Collegeville, Minnesota

St. Lawrence University
Department of Psychology
Canton, New York

St. Louis Community College
St. Louis, Missouri

St. Louis Community College - Meramec
Kirkwood, Missouri

St. Louis University
St. Louis, Missouri

St. Mary's College
Winona, Minnesota

St. Petersburg Police Department
St. Petersburg, Florida

St. Philip's College
San Antonio, Texas

St. Xavier College
Chicago, Illinois

Salem College
Winston-Salem, North Carolina

San Bernardino County Schools
Julian, California

San Diego State University
College of Business Administration
San Diego, California

Santa Clara University
Santa Clara, California

Schenectady County Community College
Schenectady, New York

Sears Roebuck & Company
Chicago, Illinois

Seattle University
Seattle, Washington

Service Merchandise Company
Nashville, Tennessee

Siena Heights College
Adrian, Michigan

Sky Chefs
Dallas-Fort Worth Airport, Texas

Social Security Administration
Baltimore, Maryland

Solotoff & Spivak
Attorneys at Law
Great Neck, New York

Southeast Missouri State University
Cape Girardeau, Missouri

Southeast Missouri State University
Student Development Center
Cape Girardeau, Missouri

Southern Bell Telephone
Atlanta, Georgia

Southern Illinois University
Edwardsville, Illinois

Southern Illinois University
Carbondale, Illinois

Southern Illinois University
College of Education
Carbondale, Illinois

Southern Illinois University
College of Liberal Arts
Carbondale, Illinois

Southern Illinois University
Eng. Mech. & Materials Tech.
Carbondale, Illinois

Southern Illinois University
Office of Academic Services
Carbondale, Illinois

Southern Illinois University
Office of Teacher Education
Carbondale, Illinois

Southwest Missouri State University
Springfield, Missouri

Southwest Texas State University
San Marcos, Texas

Spalding College
Louisville, Kentucky

Speed Scientific School
Louisville, Kentucky

Spring Arbor College
Concord, Michigan

Spring Hill College
Mobile, Alabama

Stallings & Associates
Bloomingdale, Illinois

The Standard Oil Company
Cleveland, Ohio

Stanford University
Stanford, California

State Board for Community Colleges
and Occupational Education
Denver, Colorado

State University College at Buffalo
Buffalo, New York

State University College at Plattsburgh
Plattsburgh, New York

State University of New York
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